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THE AUTOMOBILE

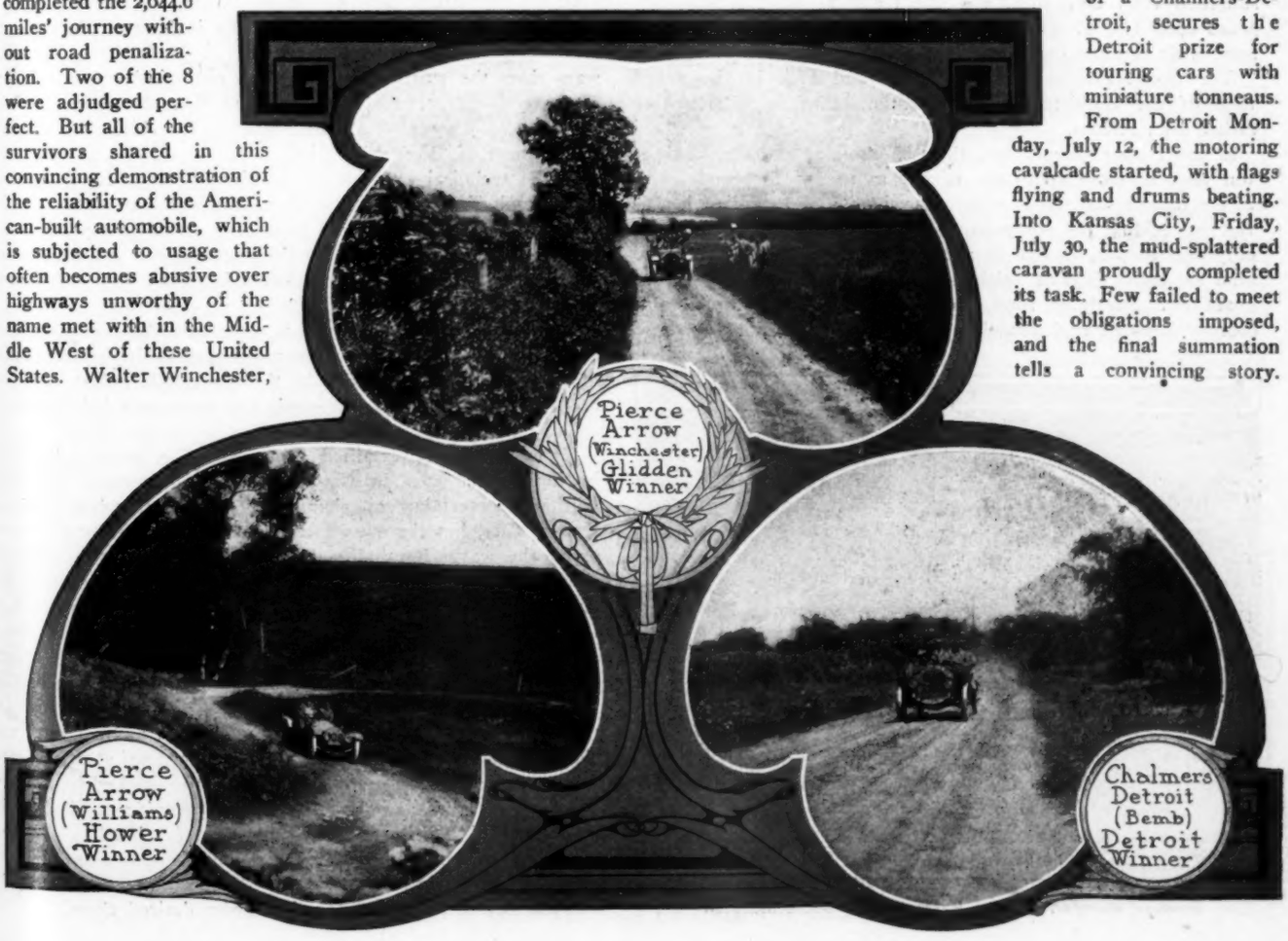
BIG TOUR ENDS WITH THREE WINNERS

Pierce Arrow (Winchester) Captures the Glidden Touring Car Trophy. Pierce Arrow (Williams) Takes the Hower Runabout Cup. Chalmers-Detroit (Bemb) Secures the Detroit Toy Tonneau Prize

EIGHT AWARDED PERFECT ROAD SCORES

No. 9 Pierce Arrow, No. 2 Premier, No. 8 Pierce Arrow, No. 5 Marmon, No. 1 Premier, No. 108 Pierce Arrow, No. 101 Moline, No. 109 Pierce Arrow

TWENTY-FOUR of the 30 contestants successfully accomplished the Sixth Annual Reliability Touring Contest of the American Automobile Association. Eight of the 24 cars completed the 2,644.6 miles' journey without road penalization. Two of the 8 were adjudged perfect. But all of the survivors shared in this convincing demonstration of the reliability of the American-built automobile, which is subjected to usage that often becomes abusive over highways unworthy of the name met with in the Middle West of these United States. Walter Winchester, driving a Pierce Arrow, obtains possession of the famous Glidden trophy. John S. Williams, piloting another Pierce Arrow, gains the glory of the Hower runabout cup. Jean Bemb, at the wheel of a Chalmers-Detroit, secures the Detroit prize for touring cars with miniature tonneaus. From Detroit Monday, July 12, the motoring cavalcade started, with flags flying and drums beating. Into Kansas City, Friday, July 30, the mud-splattered caravan proudly completed its task. Few failed to meet the obligations imposed, and the final summation tells a convincing story.



RELIABILITY was the marked characteristic of the Sixth Annual Touring Contest of the American Automobile Association, which started at Detroit, July 12, and ended at Kansas City, July 30, after a journey which totaled 2,644.6 miles.

Eight cars completed this diversified and strenuous passage without road penalizations of any sort. This is the list: No. 9 Pierce Arrow (Winchester); No. 2 Premier (Hammond); No. 8 Pierce Arrow (Dey); No. 5 Marmon (Marmon); No. 1 Premier (Jay); No. 108 Pierce Arrow (Williams); No. 101 Moline (Wicke); No. 109 Pierce Arrow (Schofield).

Of this octette, two mastered the minute technical examination without the loss of a single point: No. 9 Pierce Arrow, driven by Walter Winchester, and emerging as the winner of the Glidden trophy in the touring-car class; No. 108 Pierce Arrow, piloted by John Williams, and winner of the Hower cup for runabouts. The penalties imposed upon the remaining six detracted but slightly from the achievements of the cars.

In the competition for the Detroit prize, for cars fitted with small tonneaus, none of the trio had a perfect score, and No. 52 Chalmers-Detroit, Jean Bemb at the wheel, came through with the smallest penalization, closely pursued by No. 53 Premier, handled by C. Waltman.

With four of eight perfect road scores, and with two flawless survivors, the Pierce Arrow secured the largest amount of glory and secured it through sturdy cars, capable drivers and general all around excellence.

Of the three Premiers competing, two finished with unsmirched road travelling, and the technical penalizations imposed upon two of the three were such as to cast no discredit upon their running qualities.

The two Marmons finished fourth and fifth in the grand total of the Glidden, with penalizations that were provoking rather than serious.

In the Hower competition, the two Molines and the Lexington were so close up to the winner as to call for condolences at the infinitesmal things which prevented a clean bill of health. But in deciding the possession of a single prize there could be only one winner, though in a competition of such a prolonged kind the entire field of finishers is entitled to credit in generous quantities. Surely no road competition ever held before in this country imposed such exacting and variable conditions as those which confronted the participants in the 1909 tour. Roads of every known variety, in conditions ranging from ideal down to the most wretched substitutes for highways, were included in the twenty-six hundred odd miles travelled.

Howard Marmon and the Perfect Road Score Marmon

Michigan had good cause to be ashamed of its alleged roads. Illinois contributed very bad and very good ones in the short mileage through that commonwealth. Wisconsin proved considerable of a surprise, with uniformly good going and attractive scenery. Minnesota was crossed at an opportune period and gave perhaps the greatest enjoyment of the entire tour. Iowa, too, was traversed with satisfaction, again principally because of excellent weather conditions. Nebraska contributed some good roads and a supply of nondescript prairie progress. Colorado had several good stretches, but for the most part it was a case of lonesome tracks across scrubby plains. And, finally, Kansas did fairly well, with a concluding day that was the toughest of the entire trip.

Such knocks and twists and strains as the cars withstood emphasized the recent advance in American automobile construction. The route for the most part passed through sections of country never before visited by a big endurance tour. The interest aroused was apparent on all sides. Entertainments, almost too profuse in number, punctuated the two-day stops at Minneapolis and Denver, to say nothing of the preliminary festivities at Detroit and the concluding functions at Kansas City. Intermingled were other events at Madison, Wis.; Mankato, Minn.; Council Bluffs, Ia.; Kearney, Neb., and Salina, Kan., not forgetting lunches and other mid-day contributions received en route at innumerable places.

Of course, Chairman Frank B. Hower had to be chairman in his own way, which means that he ran the tour more or less according to his own ideas. A good man with him, for the last half of the trip, was S. B. Stevens, a board member of considerable experience in automobile competition. Dai Lewis scattered the confetti as only he can do it, and his unfailing buoyancy of spirits did much to keep many in humor whose noses occasionally got slightly out of joint. E. L. Ferguson, who always does the starting, had to drop out of the procession at Kearney, Neb., because of an accident that placed him on the retired list. Thereafter, "Mort" Reeves, the chief observer, assumed most of "Fergy's" duties.

In the technical examination at Kansas City, Henry Souther and Joseph Tracy had a difficult task which was executed with as much satisfaction as could have been given by any other two men as capably qualified to do the work. They did not pretend to interpret the rules, and whenever in doubt they called upon the chairman to make a ruling.

As to whether there will be a 1910 tour, there exists a conflict of opinion, though the general concensus is that something of this nature is still needed by the automobile industry. Some are satisfied, some are disgusted, and some are indifferent.

Kansas City Entertained Tourists—The technical examination of the cars in Convention Hall somewhat interfered with the entertainment planned by the Automobile Club of Kansas City, but there were a substantial number at liberty to enjoy the warm hospitality. The reception began on the outskirts of the city, when each arriving car was decorated with American flags, and as the cars checked in the occupants were furnished with credentials. One particularly appreciated was a card stating: "We hate to offer you water, but our cool marble pool and shower baths are at your disposal. The Kansas City Athletic Club." Then there was a book giving the freedom of the city, with a printed key, from the Mayor; and a program of the entertainment. A smoker in the evening at the Coates House opened the festivities. Saturday was marked by a morning jaunt, as guests of the city, over its magnificent oiled boulevards, the ride being followed by a buffet luncheon. There was a race meet at Elm Ridge in the afternoon, and Electric Park, with a Dutch supper, was the evening attraction, with automobile rides Sunday for those who desired them.

Lexington Which by a Minor Incident Lost Its Perfect Score Near Kansas City

TWENTY-FOUR OF 30 CONTESTANTS FINISHED THE RUN

KANSAS CITY, MO., Aug. 2—Eight of the thirty cars which started from Detroit averaged one mile every three minutes until Kansas City was reached, with five of the daily runs exceeding 200 miles. In giving credit for this remarkable traveling over varied road surfaces, attention should be called to the fact that it was done without adjustment of any kind to the cars other than permitted by the rules, which confined the work to adjusting carbureters, cleaning the gasoline line if it became clogged, cleaning of spark plugs, and the adjusting of brakes.

Although only eight finished with perfect road scores, there were twenty-four of the original thirty cars running at the finish of the tour. All honors, however, does not belong to the eight which finished with perfect scores, as some of the others did nobly.

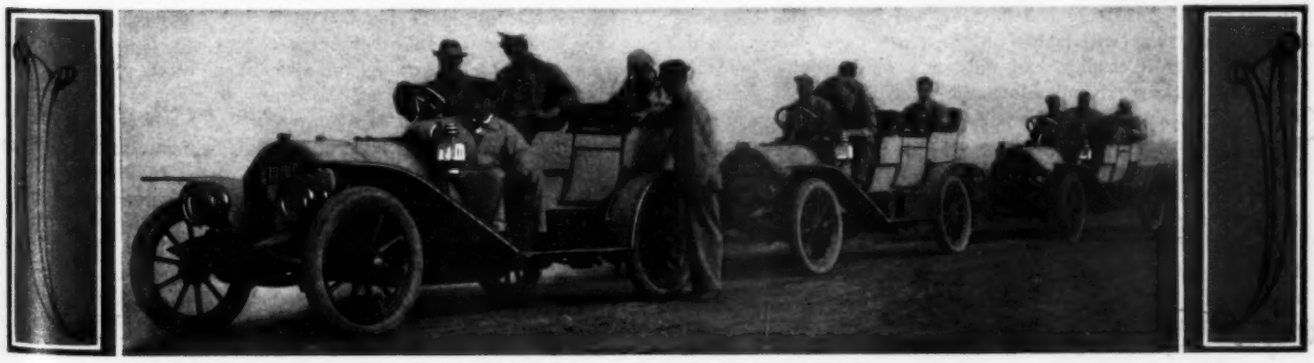
One in this class not to be overlooked was No. 114 Lexington, a car brought out in May of this year, but which throughout the tour ran with a perfect road score until within 20 miles of Kansas City when a cotter pin working out necessitated a stop to replace it, not a bit of new material having to be used. This car passed a particularly enviable technical examination, and all of the penalties were for tightening parts which undoubtedly had suffered somewhat from vibration during the long tour.

The same story might be repeated with reference to many of the other cars, as a host of the troubles which entailed penalties at the final examination were for tightening of parts that had worked loose. This vibration would not have occurred with ordinary road conditions, but on the plains of Colorado and western Kansas the cars had to travel over water courses across the road anywhere from 6 inches to 3 feet deep, at times 18 inches of water flowing through some of these. Besides, there were a score or more of dried-up sandy creek beds, into which the cars had to dip and which racked not a few of them severely.

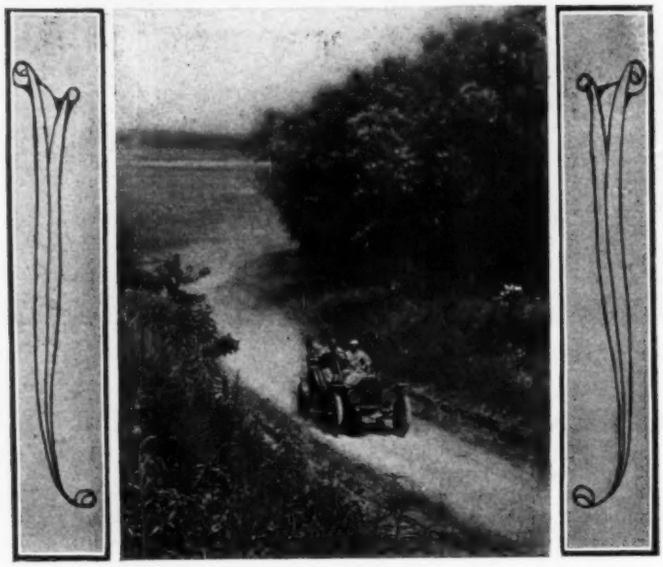
A careful analysis of the road troubles and the final technical examination show conclusively that continual vibration caused most of the troubles and that these troubles were not in the actual breaking of parts, but just in the loosening of them. Had the rules permitted of the tightening of nuts and adjusting of parts, but prohibiting the use of any new material, there would have been sixteen perfect scores at Kansas City instead of two.

The work of the four Pierce cars was commendatory from start to finish. Winchester's No. 9 and Williams' No. 108 went through with perfect road scores and passed a perfect technical examination. Williams was in the van of the tour every day, catching the official car repeatedly before the night control was reached. Winchester was always well up in front, so that neither of these cars were nursed throughout the entire trip. Although the other two Pierces, namely, No. 8 driven by Dey and No. 109 driven by Schofield, had perfect road scores, they were penalized in the technical examination. Dey's troubles were slight, one being the starting crank which was bent when dropping into a dried-up creek bed and the other was a bonnet hinge. The No. 109 car suffered from vibration, replacing a tool box torn off when dropping into a deep dried-up creek bed, and also requiring a new spring clip.

Of the three Premier cars entered officially in the run two came through with perfect road scores, and the other, No. 53, had troubles consisting of a leaking gasoline line where it rubbed against the mud apron, a broken spring, and putting on a fan belt. Both of the perfect score cars, Nos. 1 and 2, driven by Webb Jay and Harry Hammond, respectively, made over half of the run without fan belts and did not experience any trouble with heating, taking on not more than a pint of water on any day's run. On next to the last day of the run Jay broke a rear spring and was compelled to make the whole of the last day's run with the car resting on the bumper, which, considering the rough nature of the roads, was a particularly gruelling test and undoubtedly resulted in added technical penalization. All of the parts penalized in the technical examination originated from vibration. No. 2 Premier had nothing wrong in the technical examination but to replace a broken spring clip and put on a fan belt. No. 53 Premier's troubles were entirely due to vibration. During the run these cars maintained a conservative pace, starting out midway of the tour and finishing anywhere from



The Premier Trio, of Which Nos. 1 and 2 Finished with Perfect Road Scores



No. 101 Moline, One of the Perfect Road Score Cars

one-half to one hour ahead of schedule. The spring trouble which developed was unexpected, though the springs used were of a new kind that were being tested out.

Both of the Marmon cars behaved with special credit from start to finish and took a particularly clean technical examination. No. 5, driven by H. C. Marmon, had a perfect road score, and No. 4, driven by F. E. Wing, experienced but one road trouble, the loosening of a flange on the gasoline feed pipe. This was the sole trouble for the two cars on the entire trip. In the final examination the only point found on Wing's car was a piece about 3 inches long broken off the end of the bottom leaf of a spring. On No. 5 Marmon the same spring leaf had a portion broken off, and in addition there was a slight penalty for straightening a spring hanger and tightening one end of the tie rod between the steering knuckles.

A car performance that created considerable attention throughout the West in that it is a Western product was the triple Moline entry in the Hower, bearing Nos. 100, 101, and 102. No. 101 made a perfect road score. No. 100 had a sole road trouble, a piece of metal getting between the timing gears, which, when removed, had not damaged the gears, so that they were not changed or even repaired. No. 102 had an equally slight trouble which occurred twice and consisted in a taper pin holding one of the timing gears in place dropping out. To reinsert it called for considerable work, but the timing gears were not injured, and no new parts other than a pin were needed. In the technical examination the troubles, as discovered, were equally slight. A noteworthy feature about these cars is that they made the entire run without carrying spare parts of any nature, not even an extra spark plug, an extra cotter pin, or an extra bolt.

The road work of the three Chalmers-Detroit cars was particularly favorable, excepting No. 3, the Glidden entry, which burned out a connecting rod bushing and had trouble thereafter until the car was withdrawn on the ninth day. No. 52, which won the Detroit trophy, had only one road trouble, and that when the locking ring holding the bearing race on the commutator released, so that the balls on the commutator were lost, and thereafter the car made the complete trip on the magneto. In the final examination this car showed no troubles other than some loosened parts due to vibration. No. 105 in the Hower ran with a perfect road score until the last day when, within 100 miles of the finish, tire troubles ditched it, a wheel was damaged, a new one borrowed, and the car disqualified for using a borrowed wheel. This borrowed wheel was taken from the Chalmers press car, which had the wheel repaired in a blacksmith shop and completed the tour to Kansas City.

The work of the two Maxwell cars, No. 6 in the Glidden and No. 107 in the Hower, was noted daily. No. 6 had but one trouble which robbed it of a perfect road score and that was the breaking of a spring. Shock absorbers were not used on these cars. The only trouble with No. 107 on the road was a spring clip, a broken spring, and tightening a water gasket. In the technical examination the troubles of these cars appeared to be solely due to vibration. Both of these cars maintained a conservative pace throughout the run and were generally well ahead of their running schedule.

The No. 14 White had as its chief mission in the tour the demonstration of kerosene as a feasible fuel, which fuel was used from start to finish and which the driver was able to obtain at every crossroad store, at a price ranging from 6 to 8 cents less than the figure asked for gasoline. The car had but two road troubles, one on the run out of Denver, when the oiler tube had to be cleaned, and another towards the last, when a fender had to be wired up. In the technical examination the car had to have several parts tightened. This car had an unusual amount of tire trouble on the road which was apparently not due so much to the tires nor the car as to nail-catching, with which other cars shared.

The only two-cycle in the run, and one which made a particularly creditable road performance, was No. 51, American Simplex, contending for the Detroit trophy. This car would have had a perfect road score had it not been for its dropping into a deep water trench on the day's trip out of Denver. This seriously damaged the base of the radiator and loosened the steering gear, but outside of this the car had not a single instance of road trouble. In the technical examination the car received a heavy penalty for the radiator repair, and the only other penalty imposed was for a couple of broken spring leaf clips.

No. 12 Midland, in the Glidden end of the contest, had a perfect score on thirteen of the fifteen days of the tour, and the only trouble was due to a broken fender iron and a dent in the mud apron, which occurred on the Madison-La Crosse run. This car was one of the leaders into the night control on many days of the tour, and undoubtedly would have been first into Kansas City had it not been for striking a stone out of Lawrence, which destroyed a tire and badly damaged a rear wheel. Notwithstanding this the car was third at the finish and completed the day with a perfect score. In the technical examination this car was penalized for tightening several running gear parts, and had to replace two fender irons, a rear wheel, and the starting crank.

A car which suffered particularly from road penalties, but which completed the tour, and had no troubles whatever with the motor, transmission, or power plant, was the No. 10 Glide. Its troubles were all with the front springs and the spring seatings on the axle, which caused penalties from Denver on. In spite of having made several days' runs with broken springs, the final examination brought out very few defects in this car. It was indeed creditable that a car with front spring trouble should have shown so few troubles due to vibration at the completion of the run.

The only two-cylinder car to officially complete the tour as a contestant was No. 112 Mason, which made thirteen perfect score runs out of fifteen and had but two road troubles. One was a minor affair consisting of the breaking of a petcock; the other on the thirteenth day was the burning out of a bushing on a connecting rod. In other respects this car made a splendid road showing and invariably ran away ahead of its schedule. The car was never nursed along the road. In the final examination the penalties were very meager, requiring a new lamp bracket, tightening two front spring clips, replacing some cotter pins in the driving chain, and repairing a leak in the radiator.

The two Jewel entries, Nos. 7 and 111, had thirteen and eight perfect score running days, respectively. No. 7's road troubles were minor, consisting of work on a fender, and a couple of flange bolts on a wheel. No. 111 had trouble with its tire carriers, changed a spark plug, tightened some hub flange bolts, and did some work on its gas pump. The majority of the penalizations in the technical examination were occasioned by vibration as in the other cars. No. 7 was penalized for a new frame sidepice.

THE SUMMING UP OF THE TOUR

GLIDDEN TROPHY

No.	Car	Driver	Road	Technical	Total
9	Pierce-Arrow	Winchester	0	0	0
2	Premier	Hammond	0	1.5	1.5
8	Pierce-Arrow	Dey	0	1.6	1.6
5	Marmon	Marmon	0	7.3	7.3
4	Marmon	Wing	8	2.5	10.5
6	Maxwell	Gager	8.5	4.6	13.1
1	Premier	Jay	0	16.9	16.9
12	Midland	Hayes	4.3	31.3	35.6
14	White	Searles	19.3	26.2	45.5
7	Jewel	Bernhart	11.2	394.8	406.0
10	Glide	Bartholomew	682.9	6.2	689.1
11	Thomas	Buse	1,001.0	*	1,001.0
3	Chalmers-Detroit	Bolger	1,225.5	*	1,225.5

DETROIT PRIZE

52	Chalmers-Detroit	Bemb	6.0	17.8	23.8
53	Premier	Waltman	26.1	8.2	34.3
51	American Simplex	Wood	1.4	50.8	52.2

HOWER CUP

108	Pierce-Arrow	Williams	0	0	0
101	Moline	Wicke	0	1.1	1.1
114	Lexington	Moore	2	1.8	3.8
100	Moline	VanDervoort	3.1	5.2	8.3
109	Pierce-Arrow	Schofield	0	10.2	10.2
107	Maxwell	Goldthwaite	35.4	8.2	43.6
102	Moline	Gregory	46.6	2.8	49.4
111	Jewel	Uhl	38.2	69.6	107.8
112	Mason	Snyder	334.5	10.3	344.8
103	Brush	Trinkle	1,005.6	*	1,005.6
106	Hupmobile	Nelson	1,358.0	*	1,358.0
110	McIntyre	Goodwin	1,452.7	*	1,452.7
104	Brush	Huss	2,251.6	*	2,251.6
105	Chalmers-Detroit	Machesky	Disqualified		

* Withdrawn, no technical examination.

a left rear wheel, spring clips, and tightening some other parts. Of the cars that withdrew from the contest only one checked into Kansas City with the regular party, this being a Brush runabout, although the other checked in shortly after. No. 11 Thomas, driven by Amateur Buse, had a perfect score until the eleventh day, when a repair was made on the gasoline line, and it had no more trouble until the 13th day, when it withdrew, due to breaking sub-frame members when it struck a water trench. The Hupmobile withdrew, due to transmission troubles, on the run to Minneapolis; and the McIntyre motor buggy withdrew on the run into Madison owing to trouble with the steering gear when the car was ditched. The Rapid truck kept along with the party until Denver, when it went ahead to take the ascent to Pike's Peak, after which it did not touch the tour until Kansas City was reached. The arrival Sunday night in that city excited much attention and favorable comment.

EQUIPMENT OF THE CARS WHICH FINISHED

GLIDDEN TROPHY

No.	Car	Tires	Magneto	Carbureter	Speedometer
9	Pierce	Goodrich	Bosch	Pierce	Warner
2	Premier	Goodrich	Bosch	Schebler	Stewart and Warner
8	Pierce	Goodrich	Bosch	Pierce	Warner
5	Marmon	Diamond	Bosch	Schebler	Warner
4	Marmon	Diamond	Bosch	Schebler	Warner
6	Maxwell	Ajax	Splitdorf	Maxwell	Jones
1	Premier	Diamond	Bosch	Schebler	Stewart and Warner
12	Midland	Diamond	Remy	Kingston	Jones
14	White	Diamond	——	Kerosene	Jones
7	Jewel	Diamond	Bosch	Schebler	Stewart
10	Glide	Goodyear	Eisemann	Schebler	Stewart

DETROIT TROPHY

52	Chalmers-Detroit	Diamond	Bosch	Mayer	Jones
53	Premier	Diamond	Bosch	Schebler	Stewart and Warner
51	American Simplex	Goodrich	Bosch	Am. Simplex	Warner

HOWER TROPHY

108	Pierce	Goodrich	Bosch	Pierce	Warner
101	Moline	Goodrich	Bosch	Schebler	Warner
114	Lexington	Goodrich	Bosch	Schebler	Warner
100	Moline	Goodrich	Bosch	Schebler	Warner
109	Pierce	Goodrich	Bosch	Pierce	Warner
107	Maxwell	Ajax	Splitdorf	Maxwell	Jones
102	Moline	Goodrich	Bosch	Schebler	Warner
111	Jewel	Goodrich	Bosch	Stromberg	Warner
112	Mason	Diamond	Splitdorf	Schebler	Stewart
105	Chalmers-Detroit	Goodrich	Bosch	Mayer	Warner

PREMIER AND MOLINE PROTEST AWARDS

BUFFALO, Aug. 2—Alleging that Pierce cars Nos. 9 and 108 did not carry full manufacturers' specifications, protests have been filed by H. O. Smith, president of the Premier Motor Car Company, and W. H. VanDervoort of the Moline Automobile Company. The point in question is regarding tail lamps, which, it is claimed, were not carried for several days after dropping or breaking off, and that the two Pierce Arrows were not required to put them on, thus to incur a penalty for work.

The Premier protests from a Glidden class view, in that one of its cars took second place; and the Moline protests the Hower award, as a Moline finished second. Should it be decreed that the tail lamps must be placed, it is reasonable to suppose that the work would take less than a minute, so that no change would be made in the relative position of the contestants except that it would eliminate all perfect scores.

SIXTH ANNUAL A. A. A. RELIABILITY CONTEST, DETROIT, MICH., TO KANSAS CITY, MO., JULY 12 TO 30, 1909.

GLIDDEN TROPHY

No.	*Car*	*Driver*	*1st*	*2nd*	*3rd*	*4th*	*5th*	*6th*	*7th*	*8th*	*9th*	*10th*	*11th*	*12th*	*13th*	*14th*	*15th*	*Road*	*Technical*	*Total*
9	Pierce Arrow	W. F. Winchester	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	Premier	H. Hammond	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.5	1.5
8	Pierce Arrow	F. S. Dey	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.6	1.6
5	Marmon	H. C. Marmon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.3	7.3
4	Marmon	F. E. Wing	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	8	2.5	10.5
6	Maxwell	E. G. Gager	0	0	0	0	0	0	0	0	0	0	0	0	8.5	0	0	8.5	4.6	13.1
1	Premier	Webb Jay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16.9	16.9
12	Midland	E. O. Hakes	0	0	0	3.7	0	0	0.6	0	0	0	0	0	0	0	0	4.3	31.3	35.6
14	White	H. N. Searles	0	0	0	0	0	0	0	0	0	0	0	18.2	0	0.4	0.7	19.3	26.2	45.5
7	Jewel	O. P. Bernhart	0	0	0	0	0	0	0	8.8	0	0.1	2.3	0	0	0	0	11.2	394.8	406
10	Glide	A. Y. Bartholomew	0	0	0	0	0	0	0	2.6	0	9.2	119.3	28.8	247	276	0	682.9	6.2	689.1
11	Thomas	G. G. Buse, Jr.	0	0	0	0	0	0	0	0	0	0	1	0	1000	*	..	1001	xxx	1001
3	Chalmers-Detroit	Wm. Bolger	1	0.4	0	0	0	1	204	19.1	1000	*	..	..	..	..	..	1225.5	xxx	1225.5

DETROIT PRIZE

52	Chalmers-Detroit	Jean Bemb	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	6	17.8	23.8
53	Premier	Cliff Waltman	0	0	0	0	0	0	0	0.8	0	0	0	0	0	5	20.3	26.1	8.2	34.3
51	Am. Simplex	W. A. Wood	0	0	0	0	0	0	0	0	0	0	0	1.4	0	0	0	1.4	50.8	52.2

HOWER CUP

108	Pierce Arrow	J. S. Williams	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
101	Moline	J. A. Wicke	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	1.1
114	Lexington	John C. Moore	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1.8	3.8
100	Moline	C. H. Van Dervoort	0	0	0	0	0	0	0	3.1	0	0	0	0	0	0	0	3.1	5.2	8.3
109	Pierce Arrow	C. A. Schofield	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10.2	10.2
107	Maxwell	Chas. Goldthwaite	0	0	.0	2.6	0	0	1.6	0	0	0	0	0	7.7	0	23.5	35.4	8.2	43.6
102	Moline	W. S. Gregory	0	0	0	0	0	0	0	16.1	0	1	0	0	0	0	29.5	46.6	2.8	49.4
111	Jewel	A. B. Uhl	0	0	0	9	6	5.8	0	8.4	1.4	0	0	0	0	2.6	5	38.2	69.6	107.8
112	Mason	R. Snyder	0	0	0	4.3	0	0	..	0	0	0	0	0	330.2	0	0	334.5	10.3	344.8
103	Brush	F. A. Trinkle	0	0.4	0	3	2.2	1000	†	..	..	..	..	..	..	..	..	1005.6	xxx	1005.6
106	Hupmobile	Frank Steinman	0	0	0	358	1000	†	..	..	..	..	..	..	..	..	..	1358	xxx	1358
110	McIntyre	Frank Goodwin	29	423.7	1000	*	..	..	..	..	..	..	..	..	..	..	..	1452.7	xxx	1452.7
104	Brush	D. B. Huss	40.8	149.3	423.6	343.9	294	1000	†	..	..	..	..	..	..	..	..	2251.6	xxx	2251.6
105	Chalmers-Detr't.	John Machesky	0	0	0	0	0	0	0	0	0	0	0	0	0	0	x	.....	xxx	.....

* Withdrawn. † Withdrawn; continued as non-contestant. x Disqualified. xxx No technical examination.

A Typical Early Morning Start—Leaving Hugo, Colorado, en Route to Oakley, Kansas

ROAD AND EXAMINATION PENALTIES OF THE TOUR

ACCORDING to the rules of the competition the penalties, as announced at the finish, are divided into those given on the road and those resulting from the technical examination. The former include marks for lateness at any night stop, on a basis of one point per minute; marks for work done upon the cars at a rate of one-tenth of a point per man per minute, except upon material not carried at the start when the penalty for work was doubled; and penalty for material used, at a rate of one-tenth of a point per ten cents worth, or fraction, except that outside material was charged at double price.

In the technical inspection the plan was to put the contestants in safe and first-class running order, as they were at the beginning, with penalties for work and material. In the hurry at the finish of the tour there was some confusion in scoring and the result announced in Kansas City has been somewhat changed. In the examination-penalties the material has been made to read at double the regular price, as required by the rules, but the clause requiring double work-penalties upon these materials was neglected. It may be that the Contest Board will decree an alteration, although it is not likely that the relative standing of the contestants would be greatly changed.

As the committee went over the cars they gave the entrants the choice of taking the penalty which they imposed, in regard to the amount of work necessary to replace or repair any part, or of trying to beat this by actual work. E. O. Hayes made a record when instead of 30 minutes to change a wheel on his Midland he took four and a half, thereby saving 2.5 points from his total score. Another example of quick work was that in which Roy Snyder, in one minute instead of five, tightened two spring clips on his Mason. In many cases the drivers were satisfied that they could not take successful issue with the technical men on these points. Herewith is the detailed story:

GLIDDEN TROPHY

No. Car	Penalties		Total
9 PIERCE-ARROW			
ROAD		0	0
TECHNICAL EXAMINATION		0	0
2 PREMIER			
ROAD		0	0
TECHNICAL EXAMINATION			
Tightening one broken spring clip, 7 min.		.7	
Material, 30 cents		.3	
Replacing fan belt, 2 1-4 min		.3	
Replacing fan belt, 3-4 min		.1	
One link for fan belt, 5 cents		.1	1.5
			1.5
8 PIERCE-ARROW			
ROAD		0	0
TECHNICAL EXAMINATION			
Straightening starting crank, 3 min		.3	
Material, starting crank handle, 60 cents		1.2	
Repairing hinge on bonnet, 2 sec		.1	1.6
			1.6
5 MARMON			
ROAD		0	0
TECHNICAL EXAMINATION			
Tightening right end, cross steering rod, 15 min.		1.5	
Material, new bolt, 10 cents		.2	
Replacing bottom leaf, front spring, 30 min.		3.0	
Material, spring leaf, 30 cents		.6	
Straightening left rear spring hanger, 20 min.		2.0	7.3
			7.3
4 MARMON			
ROAD			
Labor, repairing gasoline feed pipe		6.8	
Use of outside tool		1.0	
Material, tape		.2	8.0
TECHNICAL EXAMINATION			
Replacing bottom leaf, front spring, 10 min.		1.0	
Material, spring leaf, 30 cents		.6	
Replacing broken step hanger, 5 min		.5	
Material, new step hanger, 20 cents		.4	2.5
			10.5
6 MAXWELL			
ROAD			
Replacing front spring, 40 min		.4	
Material, new spring, $4.50		4.5	8.5
TECHNICAL EXAMINATION			
Tightening steering column anchor bolts, 4 min.		.4	
Tightening right front wheel bearing, 4 min.		.4	
Tightening truss rod, 10 min		1.0	
Material, bolt, 10 cents		.2	
Replacing 2 rear univ'l-joint bushings, 20 min.		2.0	
Material, universal-joint bushings, 40 cents.		.4	
Tightening magneto advance rod, 2 min		.2	4.6
			13.1
1 PREMIER			
ROAD		0	0
TECHNICAL EXAMINATION			
Tightening left rear wheel, 2 min		.2	
Tightening front spring clip, 2 min		.2	
Replacing broken spring clip, 7 min		.7	
Material, spring clip, 30 cents		.3	
Tightening right front and left rear engine bolts, 1 1-2 min		.2	
Replacing and tightening fan belt, 1 min		.1	
Tightening left front transmission foundation bolt, 3 min		.4	
Replacing vent pipe cover, 1 min		.1	
Material, vent pipe cover, 10 cents		.2	
Replacing upper quarter rear spring, 60 min.		6.0	
Material, new spring quarter, $4.25		8.5	16.9
			16.9
12 MIDLAND			
ROAD			
Labor in tightening front fender, 16 min		1.6	
Material, wire and strap, 30 cents		.6	
Labor in straightening bent mud pan, 15 min.		1.5	
Labor in tightening front fender, 6 min		.6	4.3
TECHNICAL EXAMINATION			
Replacing right rear wheel, 4 1-2 min		.5	
Material, new wheel, $7.50		15.0	
Replacing broken starting crank, 9 min		.9	
Material, $1		2.0	
Replacing both front fender irons, 90 min.		9.0	
Material, fender irons, 70 cents		1.4	
Tightening left rear spring clip, 5 sec		.1	
Tightening brake anchors, 20 min		2.0	
Tightening right front and left rear engine bolts, 2 min		.2	
Tightening gasoline pipe bracket, 1 min		.1	
Material, one bolt, 5 cents		.1	31.3
			35.6
14 WHITE			
ROAD			
Labor, cleaning lubricator pipe line, 22 min.		2.2	
Time, late, 16 min		16.0	
Tightening fender, 3 min		.3	
Material, wire		.1	
Tightening fender, 6 min		.6	
Material, wire		.1	19.3
TECHNICAL EXAMINATION			
Tightening steering gear, 13 min		1.3	
Tightening tire iron brackets, 4 min		.4	
Tightening left rear fender, 40 sec		.1	
Removing and replacing drain pipe to heater, 7 min.		.7	
Outside labor, cutting thread on drain pipe, 5 cents		.2	
Adjusting right front wheel bearing, 7 min.		.7	
Tightening left front fender, 1 min		.1	
Replacing gear shifting pin and cotter, 1 min.		.1	
Material, pin and cotter, 20 cents		.4	
Replacing 1 screw and tightening 1 screw on overflow pipe, 1 min		.1	
Material, screw, 10 cents		.2	

No.	Car	Penalties		Total
14	WHITE—Technical examination—Continued			
		Replacing 2 mud-guard screws, 1 min.	.1	
		Material, screws, 20 cents	.2	
		Replacing right fender bracket, 5 min.	.5	
		Material, fender bracket, 20 cents	.2	
		Replacing right front spring, 45 min.	4.5	
		Material, spring, $5.40	10.8	
		Replacing lamp bracket, 5 min.	.5	
		Material, lamp bracket, $2	4.0	
		Replacing crankcase oiler tube, 5 min.	.5	
		Material, oiler tube, 30 cents	.6	26.2
				45.5
7	JEWEL			
	ROAD			
		Tightening hub flange bolts, 80 min.	8.0	
		Material, bolts	.8	
		Tightening fender, 1 min.	.1	
		Replacing fan belt and cotter pin, 17 min.	1.7	
		Material, fan belt	.5	
		" cotter pin	.1	11.2
	TECHNICAL EXAMINATION			
		Replacing repaired front spring clips, 46 min.	4.6	
		Material, spring clips, 30 cents	.6	
		Work on left rear wheel, 5 min.	.5	
		Material, spokes, etc., $3	6.0	
		Tightening torsion rod, 5 min.	.5	
		Tightening differential shaft housing, 3 min.	.3	
		Tightening 1 rear spring clip, 3 min.	.3	
		Replacing cracked frame side member, 48 hrs.	288.0	
		Material, side member of frame, $30	60.0	
		Replacing 2 radiator brackets, 5 hours	30.0	
		Material, radiator brackets, $2	4.0	394.8
				406.0
10	GLIDE			
	ROAD			
		Repairing steering arm, 16 min.	1.6	
		Material, steering arm	1.0	
		Replacing front spring, 50 min.	5.0	
		Material, front spring	4.2	
		Lateness, time, 113 min.	113.0	
		Labor on fan belt and front spring, 62 min.	6.2	
		Material, wire	.1	
		Replacing front spring, 164 min.	16.4	
		Material, front spring	12.4	
		Time, lateness, 215 min.	215.0	
		Labor on front spring seats, 257 min.	25.7	
		Material, spring seats	6.3	
		Labor and material, front spring seats	276.0	682.9
	TECHNICAL EXAMINATION			
		Replacing bonnet catch, material 10 cents	.2	
		Tightening radiator set screw, 1 min.	.1	
		Tightening step bracket, 15 min.	1.5	
		Material, step bracket, 10 cents	.2	
		Replacing spring clips, 15 min.	1.5	
		Material, spring clips, 2 at 20 cents each	.8	
		Riveting spring clips in place, 15 min.	1.5	
		Material, 20 cents	.4	6.2
				689.1
11	THOMAS			
	ROAD			
		Repairing gasoline feed pipe, 10 min.	1.0	
		Withdrawn	1,000.0	1,001.0
3	CHALMERS-DETROIT			
	ROAD			
		Tightening fender, 4 min., 4 min., 10 min.	1.8	
		Material, wire and strap, 60 cents	.6	
		Labor, examining crank shaft bearings, 29 min.	2.9	
		Use of outside tool	.6	
		Labor on connecting rod bearing, 140 min.	14.0	
		Material, connecting rod bearings	1.6	
		Removing and replacing mud pan, crank case and tightening connecting rod, 170 min.	17.0	
		Time, lateness, 187 min.	187.0	
		Withdrawn	1,000.0	1,225.5
	DETROIT PRIZE			
52	CHALMERS-DETROIT			
	ROAD			
		Labor on commutator shaft connections	5.8	
		Tightening motor bolts	.2	6.0
	TECHNICAL EXAMINATION			
		Tightening left rear fender iron, 1 1-4 min.	.2	
		Tightening bevel gear pinion housing, 9 min.	.9	
		Tightening rear truss rod, 1 min.	.1	
		Replacing screw on bonnet ledge, 1 min.	.1	
		Material, screw, 10 cents	.2	
		Tightening motor foundation bolts, 7 min.	.7	
		Replacing commutator and bearing balls, 45 min.	4.5	
		Material, $4.30	8.6	
		Replacing right steering arm split washer, 5 min.	.5	
		Material, 10 cents	.2	
		Tightening foot-brake drums, 17 1-2 min.	1.8	17.8
				23.8
53	PREMIER			
	ROAD			
		Repairing gasoline feed pipe, tightening lamp, 8 min.	.8	
		Labor on rubber spring bumper, wiring pan, 29 min.	2.9	
		Material, bumper and wire	2.1	
		Labor and material, new spring	20.3	26.1
	TECHNICAL EXAMINATION			
		Replacing front spring clip, 7 min.	.7	
		Material, 30 cents	.3	
		Repairing leak in radiator, 60 min.	6.0	
		Tightening motor foundation bolts, 1 1-2 min.	.2	
		Tightening water pump stuffing box, 10 min.	1.0	8.2
				34.3
51	AMERICAN SIMPLEX			
	ROAD			
		Labor on leaking radiator, 4 min.	.4	
		Labor on bent steering gear, 8 min.	.8	
		Outside material, grease for radiator, 10 cents.	.2	1.4
	TECHNICAL EXAMINATION			
		Repairing radiator, 8 hours	48.0	
		Replacing 2 broken spring clips, 20 min.	2.0	
		Material, 40 cents	.8	50.8
				52.2
	HOWER CUP			
108	PIERCE-ARROW			
	ROAD		0	0
	TECHNICAL EXAMINATION		0	0
				0
101	MOLINE			
	ROAD		0	0
	TECHNICAL EXAMINATION			
		Replacing bolt in step hanger, 1 min.	.1	
		Material, 10 cents	.2	
		Tightening three spring clips, 1 1-4 min.	.2	
		Repairing cap screw on oiler base, 6 min.	.6	1.1
				1.1
114	LEXINGTON			
	ROAD			
		Labor in replacing cotter pin in rear axle housing	2.0	2.0
	TECHNICAL EXAMINATION			
		Tightening distance rod, 2 min.	.2	
		Tightening pinion shaft bearing housing, 7 min.	.7	
		Tightening right spring clip, 1 min.	.1	
		Tightening 3 rear spring clips, 6 min.	.6	
		Tightening carbureter-hot-water-jacket pipe, 1 min.	.1	
		Repairing commutator rod connection, 1 min.	.1	1.8
				3.8
100	MOLINE			
	ROAD			
		Removing piece of steel from crankcase, 31 min.	3.1	3.1
	TECHNICAL EXAMINATION			
		Labor on oiler driving mechanism, 50 min.	5.0	
		Material, taper pin, 10 cents	.2	5.2
				8.3
109	PIERCE-ARROW			
	ROAD		0	0
	TECHNICAL EXAMINATION			
		Tightening steering drop arm, 7 min.	.7	
		Tightening left front wheel bearing, 5 min.	.5	
		Replacing spring clip, 7 min.	.7	
		Material, spring clip, 30 cents	.3	
		Replacing truss rod pin, 1 min.	.1	
		Material, truss rod pin, 10 cents	.1	
		Replacing tool box bracket and tail light, 30 min.	3.0	
		Material, bracket, 60 cents	1.2	
		" tail light, $3.50	3.5	10.2
				10.2
107	MAXWELL			
	ROAD			
		Replacing spring clip, 11 min.	2.2	
		Material, new spring clip, 20 cents	.4	
		Tightening cylinder water gasket	1.6	
		Replacing front spring, 32 min.	3.2	
		Material, front spring	4.5	
		Replacing 2 spring clips, 20 min.	2.0	
		Material, spring clips	.5	
		Time, lateness, 21 min.	21.0	35.4
	TECHNICAL EXAMINATION			
		Tightening right front wheel, 2 min.	.2	
		Tightening right front dust cap, 1 min.	.1	
		Tightening bevel pinion housing, 2 min.	.2	
		Replacing collar bolt, 1 min.	.1	
		Material, collar bolt, 10 cents	.2	
		Replacing right front spring saddle, 10 min.	1.0	
		Material, $1.60	3.2	
		Replacing water pipe gasket, 30 min.	3.0	
		Material, gasket, 10 cents	.2	8.2
				43.6
102	MOLINE			
	ROAD			
		Replacing water flange inlet cap screw, 1 min.	.1	
		Replacing pin in camshaft gear hub, 16 min.	16.0	
		Tightening fender, 8 min.	.8	
		Material, bolt for fender, 10 cents	.2	
		Labor on camshaft gear hub pin	13.3	
		Material, taper pin	.2	
		Time late, 16 min.	16.0	46.6
	TECHNICAL EXAMINATION			
		Replacing 2 outside brake-band guides, 20 min.	2.0	
		Material, 20 cents	.4	
		Tightening transmission bearing set screw, 3 min.	.3	
		Tightening jackshaft bearing lock nut, 30 sec.	.1	2.8
				49.4
111	JEWEL			
	ROAD			
		Lateness, 9 min.	9.0	
		Removing and replacing gasoline pump cock, 10 min.	1.0	
		Outside labor, rethreading gasoline pump cock	3.8	
		Labor on tool box hinges	1.0	
		Material, hinges, 10 cents	.2	
		Tightening hub flange bolts	5.6	
		Material, washer, 10 cents	.2	

111 JEWEL—Road—Continued

Replacing spring clip and work on wheel	4.4	
Material, spring clip	.2	
Tightening tire holders, 7 min.	.7	
Material, wire	.2	
Use of outside tool	1.0	
Change of spark plug, 4 min.	.4	
Material, new spark plug, $1	1.0	
Repairing leak in gasoline feed pipe	7.2	
Material, tape and soap	.4	38.2
TECHNICAL EXAMINATION		
Remaking two rear wheels, 10 min.	1.0	
Material, $6	12.0	
Replacing rear cross spring, 60 min.	6.0	
Material, $2.80	5.6	
Replacing front spring, 60 min.	6.0	
Material, $2.80	5.6	
Tightening right rear spring clip, 4 min.	.4	
Tightening left rear spring clips, 4 min.	.4	
Tightening differential pinion housing, 4 min.	.4	
Replacing brake brace bolt, 1 min.	.1	
Material, bolt, 10 cents	.2	
Tightening rear transmission bearing, 3 min.	.3	
Adjusting transmission bearings, 6 min.	.6	
Replacing left radiator bracket, 150 min.	15.0	
Material, bracket, $1	2.0	
Repairing leak in gasoline line, 60 min.	6.0	
Straightening front spring horns, 60 min.	6.0	
Material, $1	2.0	69.6
		107.8

112 MASON
ROAD

Labor in changing pet cock, radiator to cylinder	2.2	
Labor in making wooden plug for radiator, 19 min.	1.9	
Material, wooden plug, 10 cents	.2	
Time, late, 296 min.	296.0	
Labor on piston pin bushing	33.0	
Material, new bushing	.2	
Use of outside tool	1.0	334.5
TECHNICAL EXAMINATION		
Replacing 59 cotter pins in driving chain, 21 min.	2.1	
Material, cotter pins, 20 cents	.2	
Tightening two front spring clips, 1 min.	.1	
Repairing leak in radiator, 60 min.	6.0	
Material, 10 cents	.1	
Replacing one new lamp bracket, 10 min.	1.0	
Material, lamp bracket, 40 cents	.8	10.3
		344.8

103 BRUSH
ROAD

Tightening connecting rod bearing, 4 min.	.4	
Replacing radius rod, 24 min.	2.4	
Material, new radius rod, 60 cents	.6	
Replacing radius rod, 16 min.	1.6	
Material, new radius rod, 60 cents	.6	
Withdrawn, 1,000 points	1,000.0	1,005.6

106 HUPMOBILE
ROAD

Time, lateness, 358 min.	358.0	
Withdrawn, 1,000 points	1,000.0	1,358.0

110 McINTYRE
ROAD

Time, lateness, 434 min.	434.0	
Welding part on rear spring bar, 187 min.	18.7	
Withdrawn, 1,000 points	1,000.0	1,452.7

104 BRUSH
ROAD

Time, lateness, five days, 1,176 min.	1,176.0	
Labor on connecting rod bearings, 304 min.	30.4	
Material, connecting rod bearings, 90 cents.	.9	
Labor on connecting rod	34.4	
Material, new connecting rod	9.2	
Repairing gasoline feed pipe, 5 min.	.5	
Material, one nut	.1	
Tightening rear wheel cone, 1 min.	.1	
Withdrawn, 1,000 points	1,000.0	2,251.6

105 CHALMERS-DETROIT
ROAD
Disqualified, last day, for use of outside wheel.

WHAT PARTS THE CONTESTANTS CARRIED

IN order to keep close watch upon the amount of repairs necessary for the contestants, each car had its spare parts sealed in canvas bags. Before leaving Detroit the entrant was required to give an itemized list of the extras and show them to the chief inspector as they were placed in the receptacle. If at any time it was incumbent upon the driver to use something from the spare parts bag, the observer made note of the opening and of the materials requisitioned. At the completion of the tour the bags were turned over for inspection to the same man who had sealed them. Some of the cars carried few extras and in some cases none.

The list is as follows:

GLIDDEN TROPHY

NO. 1 PREMIER—2 low tension igniter plugs, 2 jump spark plugs, 1 valve cap yoke, 1 valve spring, 1 valve.

NO. 2 PREMIER—Same as car No. 1.

NO. 3 CHALMERS-DETROIT—2 rolls of copper wire, 1 box cotter pins, 1 roll tire tape, 1 coil solder wire.

NO. 4 MARMON—1 carbureter air valve, 1 air valve spring, 1 carbureter guide, 1 carbureter nut, 1 valve, 1 valve spring, 1 valve washer, 2 split valve washers, 1 fan belt, 2 spark plugs, 1 ball bearing, 1 piece water pump packing, 4 spark plug gaskets, 2 valve cover gaskets, 2 shoulder pins, 13 nuts, 5 cap screws, 9 taper pins, 10 washers, 12 cotter pins, 4 pieces rubber hose, 3 hose couplings, 1 piece annealed wire, 1 can "Smooth-on."

NO. 5 MARMON—Same as Car No. 4.

NO. 6 MAXWELL—Right and left steering knuckles, right and left steering knuckle arms, 2 large and 2 small steering knuckle cones, 1 drive shaft yoke, 1 pinion shaft yoke, 2 sets universal yoke pins, pin locks, pin lock screws, 1 driving pinion support complete, 1 inside and 1 outside ball races complete, Splitdorf carbon brushes and copper brushes, 1 front and 1 rear spring, 1 universal cross, 2 steering knuckle cone lock nuts, 3 steering arm nuts, 4 spark plugs, 2 spring straps, 97 cotter pins, 1 magneto breaker arm and screws, 1 roll tape.

NO. 7 JEWEL—1 D. W. F. bearing, 1 valve, 1 valve spring, 1 fan belt, 1 coil copper wire, 1 box cotter pins, 1 roll tape.

NO. 8 PIERCE ARROW—6 spark plugs, 1 inlet valve complete with spring, spool and cotter, 1 exhaust valve complete with spring, spool, and cotter, 1 fan belt, 1 package cotter and taper pins, 1 master vibrator spring.

NO. 9 PIERCE ARROW—Same as car No. 8.

NO. 10 GLIDE—1 double steering arm, 1 single steering arm, 4 roller bearing cones, 3 valves, 1 package emery, 3 fan belts, 1 package assorted washers and screws, 1 front spring, 3 front spring clips, 9 spark plugs, 1 box assorted washers and cotters, 1 package soft wire, 5 feet rubber hose, 1 roll tire tape.

NO. 11 THOMAS—4 spark plugs with gaskets, 4 countershaft keys, 1 chain, 2 F. S. ball bearings, 1 aluminum water pump connection, 6 hose clips, 18 inches rubber hose, 1 foot copper pipe, 3 pieces rubber hose, 6 sheets emery cloth, 1 bag assorted nuts, bolts, and pins.

NO. 13 MIDLAND—2 upper and 2 lower rear spring clips and nuts, 2 front spring clips, 2 front spring shackles, 2 front spring bolts and nuts, 1 right and 1 left steering spindles, 10 spark plugs, 1 set magneto parts, 1 box cotter pins, nuts, washers, soldering set.

NO. 14 WHITE—1 vaporizer, 2 pilot lights, 1 small spring, 1 box packing, 1 coil wire.

DETROIT TROPHY

NO. 51 AMERICAN SIMPLEX—26 nuts and pins, magneto carbon holder, 1 spool copper wire, 3 adapters, 6 spark plugs, 12 spark plug gaskets, 1 piece 1-4 inch brass pipe, assorted cotter pins, 1 muffler cut-out spring.

NO. 52 CHALMERS-DETROIT—4 spark plugs, roll tape, box cotter pins, roll copper wire.

NO. 53 PREMIER—Same as car No. 1.

HOWER CUP

NOS. 100, 101, 102 MOLINE—One roll copper wire each.

NOS. 103, 104 BRUSH—1 cam gear and shaft complete, 1 transmission coupling, 1 spring post, 1 chain, 2 pair connecting rod bushings, 5 Winkley oilers, 2 large and 2 small bearing cones, 4 meter links, 4 set screws, 1 sprig and bracket, 5 valve springs, 1 right front spindle, 1 grease cup, 1 starting ratchet, 8 step bolts, 11 carriage bolts, 2 commutator springs, 2 starting crank pins, 5 check nuts, 15 lock washers, 88 steel balls, 2 spindle adjusting nuts complete and 2 screws, 1 roll tape, 1 box assorted keys, 1 carbureter complete, 3 spark plugs, 20 feet copper wire, 1 valve.

NO. 105 CHALMERS-DETROIT—8 spark plugs, 1 roll tape.

NO. 106 HUPMOBILE—1 carbureter, 1 magneto, 2 shackle bolts, nuts, and washers, 4 spark plugs, roll tire tape, roll copper wire, 1 piece emery cloth, 2 complete sets front roller bearings, 1 complete set rear roller bearings, 1 front spring clip complete, 1 radius rod complete, 1 transmission sliding member, 1 cross steering connection complete, 4 hand-brake-to-shaft pins, 1 rear wheel axle pin, 1 clevis pin, 2 right and 2 left adjusting cones with 1 nut each, 1 stationary cone and washer.

NO. 107 MAXWELL—Same as car No. 6.

NO. 108, 109 PIERCE ARROW—Same as cars Nos. 8 and 9.

NO. 110 McINTYRE—10 axle clips and bolts, 1 set transmission fibers, 4 rocker arms complete, 4 crank base bearings, 4 valves and cotters, 2 piston pins and bushings, 4 valve springs, 2 connecting rods with bushings, 6 piston rings, 4 cylinder head gaskets, 1 transmission gear complete, 1 high speed clutch, 4 roller bearings, 2 gasoline pipes, 1 grease cup, 4 differential bushings, 2 radius rods, 10 feet ignition wire, 4 grease cups, 1 push rod with rollers, 3 valve spring discs, 1 steering rod bolt, 1 knuckle bolt, 12 cap screws, 4 check valves for oiler, 4 taper pins, 15 feet driving chain, 24 chain repair links, 1 carbureter, 2 wire belts, 2 spark plugs.

NO. 111 JEWELL—8 spark plugs, 1 fan bolt, 2 rolls tire tape, 1 box cotter pins.

NO. 112 MASON—1 pair rear axle bearings, 6 valve springs, 2 valves, 1 set valve parts, 4 spark plugs, 15 chain links, 5 feet magneto cable, 16 bolts nad nuts, box cotter pins, 1 connecting rod and main bearing bushings, 1 valve lifter roller and push rod complete, 1 front and 1 rear spring clip, 1 pot cock, 1 roll tire tape, 1 piece solder, 1 coil wire, 1 magneto timer, 2 battery connectors, 1 roll tire tape, 2 brake pins, 1 valve pin, 1 sheet emery cloth.

NO. 114 LEXINGTON—1 fan belt, 2 rawhide strings, 10 spark plugs, 4 sheets emery cloth, 1 box valve grinding composition, 1 roll tape, 10 spring bolts with nuts, 2 spring shackles, 4 yoke ends, 1 turnbuckle, 4 valve springs, washers, and keys, 2 gasoline shut-off cocks, 4 gasoline connections, 72 bolts, nuts, and screws, 11 rivets, 132 cotter pins, 41 lock washers, 3 carbureter throttle screws, 4 carbureter needle valves, 3 air valve springs, 1 air valve adjusting screw and nut, 1 Woodruff key, 1 tubing connector.

Midland Passing Through Topeka, the Capital of Kansas, on the Final Day of the Run

THE THREE FINAL DAYS THAT CONCLUDED THE TOUR

OAKLEY, KAN., July 28—Across the prairies the lessening cavalcade came to-day from Hugo, Col., after one of the toughest runs since the big tour started July 12 in Detroit. The open country traveling between Colorado Springs and Hugo had been comparatively easy, and this gave rise to the hope that to-day's run would be equally uneventful. The first 30 of the 165 miles to this night stop supplied the most treacherous kind of roads. Vegetation hid deep holes, and of ruts there were innumerable ones that scraped the bellies of the cars, and shook machines and occupants until they ached in concert.

Near Aroya deep ravines nearly put several cars out of the reckoning, and other fordings interspersed the hard journey. About half way Colorado was bidden adieu with mingled regrets and thanks, and for a time it looked as though Kansas prairie might be an improvement. Perhaps it was, but nevertheless there was some difficult going en route here, and all felt relief when they caught sight of the line of Pullman sleepers alongside the typical Union Pacific station. Kansas presented more rolling prairie than did Colorado, but as a whole this automobiling on flat country becomes monotonous, especially with a torrid sun shooting its rays earthward at over a hundred degrees. Rain threatened during the afternoon, which caused the sky to become partially overcast and somewhat curbed the stifling atmosphere. The few towns passed through found the people from the country round gathered to catch a sight of the "Gliddenites," who accepted with blasé indifference the homage of the "common people," who unfortunately knew not that this was the result of hand wavings and other greetings for some two thousand miles through seven States.

A Day of Penalties—Superstition may not hold much sway among Glidden tourists, but nevertheless this was the thirteenth running day of the contest, and there were more serious derangements upon the road than ever before. The roughness of the highway, the presence of the semi-concealed washouts, and one or two difficult fords wrought havoc with the condition of contesting and non-contesting cars. In addition to the points which were brought out in the penalties, those at the finish were able to detect derangements which will be unearthed later.

One of the deep gulleys near the finish of the run was responsible for an accident to the big six-cylinder Thomas, driven by Gus Buse, Jr. The car was crossing the plains at nearly a 50-mile an hour clip when the ditch confronted the river. He set his brakes, but the car dropped into the gulch, and it was so racked that its motor sub-frame and a water connection were broken. It was seen that the engine was out of line, and so no attempt was made to bring it in under its own power. Buse decided to withdraw, thus incurring a penalty of 1,000 points in addition to the single point previously charged.

The two Maxwell cars, one in the touring car class with a previous perfect score, and the other, a roadster, were penalized for using new springs. The cars are two of the few in the tour without shock absorbers, and the great strain of the miserable roads proved too great. The touring car broke its left front spring yesterday, and replaced it this morning just after checking out. This penalty of 8.5 points, four of which were for labor, reduced the number of clean Gliddenites to five. The same number of points were given Goldthwaite, the Hower trophy Maxwell pilot.

Springs have been giving trouble in several quarters, and as a result of a long run on one spring before reaching Denver, the Glide this afternoon experienced further inconvenience. The spring seat on one side gave way, allowing the axle to shift, and necessitating a new one. Temporary repairs were made, and the car arrived late to-night.

The Mason two-cylinder car broke the tie rod in its steering gear and came in late to-night.

Jean Bemb, in his Chalmers-Detroit car, in the Detroit trophy class, also had a "thirteenth" happening. While filling with gasoline at the station before checking in this evening, a five-gallon can similar to those with which gasoline was being dealt out, was picked up and emptied into the tank. A few minutes later, after the car had been officially checked, the motor stopped, and it was discovered that the can was full of water, and belonged to another contestant. Chairman Hower allowed Bemb to drain his tank and fill with the real liquid without penalization. This ruling could hardly have been otherwise.

FOURTEENTH DAY—OAKLEY TO SALINA

(199.7 Miles)

SALINA, KAN., July 29—This was the hottest day of the tour, and at times it seemed as though Hades had something to do with the stifling atmosphere. The roads were fairly good, and even those which were ordinary proved exceptionally easy for even the lowest-powered cars. As one neared the day's destination the country improved, with the soil more fertile and occasional breaks from the monotonous plains. Corn grew higher and prosperity seemed more universal. When the day was done "Globe-Girdler" Glidden said that the weather reminded him of India and the scenery of the lowlands of Scotland.

Salina, with a population of about 13,000, has some 160 cars. It has an automobile club in process of vigorous growth, with W. W. Watson as president and George D. Adams as secretary. The four local garages had the greeting of the visitors in charge, and the one most appreciated thing was the inviting natatorium, where the dusty travelers hied with unanimous accord, there to splatter and soak for a couple of hours. These are the four concerns which engineered the welcoming: J. F. Ollinger and H. L. Center, selling Olds and Regal; the Natural Body Brace Company, Howard Rash, manager, handling the Maxwell; Central Kansas Auto Company, George Weisgerber, manager, selling the Great Smith, Ford, Overland, White and Brush; and the Salina Auto Company, F. B. Shellaberger, manager, selling Franklin and Buick.

Apparently the weather was too much for both Chairman Hower and Committeeman Stevens, for they gave up their places in the pace-making car to J. C. Kerrison and Howard Reynolds, two Bostonese newspaper men, who stuck it out in company with Mr. Glidden.

Five Penalizations Were Levied—Five cars felt the pencil of the official scorekeeper, though only one had a very large amount. The Glide touring car, driven by A. Y. Bartholomew, suffered most severely, and 276 points were added to those of previous days. The spring seat trouble on the front axle was remedied, and Mr. Bartholomew showed good sportsmanship by taking it, denying reports that he would withdraw. By the expenditure of a few cents he secured iron to replace the broken seats, and 25.7 points represented the labor. The work took so much time, however, that he was 215 minutes late, giving him his total of 276, and a grand total of 406.9.

The White steamer had to fix a fender, losing .4 of a point, .1 of which was for the wire and the remainder for the work. The only car in the Detroit class penalized was the Premier, which had 5 points given, 2.1 for material, in this case a rubber bumper and some wire. The bumper was used under a spring and the wire for fastening the mudpan, the total for material and labor of 5 points increasing the Premier's score to 5.8. The Jewel roadster lost 2.6 points, being the only Howerite penalized, for repairing a leaky gasoline feed pipe.

Two changes in penalties of previous days were announced this evening, that of the Maxwell roadster being 7.7 yesterday for its new spring, and the record of the Mason, which broke a piston pin bushing, being 330.2 points.

FIFTEENTH DAY—SALINA TO KANSAS CITY

(212.8 Miles)

Kansas City, Mo., July 30—The final day of the tour was a back-breaker, and the casual remark of Pathfinder Lewis at Minneapolis, that the wind-up would prove interesting to all, was brought to mind soon after the tough ride had begun. It had rained during the night and the precipitation had been sufficient to put the gumbo roads into fairly slippery condition, meaning the use of chains and a sliding crawl for some fifty miles. The clouds threatened more water, and until noon there were spasmodic showers which aided in making the roads more difficult.

Some four miles beyond Junction City was passed the hilltop monument which designates the geographical center of the United States. A half mile more and the largest cavalry fort in the country, Fort Riley, interested the tourists. Then a couple of miles further on and the first capitol of Kansas presented a relic of past glory, roofless and windowless, the abiding place of owls and rats. Scarcely three miles more and Ogden, the oldest town in the State, presented a picture of utter indifference to progress, for apparently the village belongs to the Rip Van Winkle class, and doesn't care much about it, either.

Manhattan, 71 miles from Salina, put on some metropolitan airs, including a betterment of the roads, which continued more or less to the conclusion.

Going through Topeka, the factory of the Great Smith car was passed, and of course there were enthusiastic greetings to the mud-splattered caravan. Near Kansas City the hills increased in length and height, with road surfaces rugged and stony. From Shawnee there was a macadam road into the city, though it supplied more dust and dirt than all the rest of the day combined.

The checking-in was in front of the Coates House, and there were sighs of great satisfaction as one after another the cars reported for the last time. "Jack" Williams, with his No. 109 Pierce, was first, though his No. 12 Midland, with E. O. Hayes driving, made what might have been a successful run for the honor had he not met with a most bothersome puncture in a ditch across the road, some thirty miles from the finish.

A single mark was listed in the Detroit trophy class. This was one of 20.3 to the Premier, driven by Waltman, for work upon springs and the replacement of one.

The Molines came in with a unique record in several ways, one of which was that there had not been a spark plug removed from any one of the trio during the entire trip.

The two-cylinder Mason had the desirable goose egg for its final run.

Heavy Penalization Resulted—Nearly one-third of the competing cars were penalized as a result of this strenuous grind through the oozy mud of Kansas. Seven machines had to have time expended upon them in adjusting or repairing, and two of these in the Hower trophy ranks had had perfect records up to this time. The newcomer from the "Blue Grass" region, and the "Bluebird," from Detroit, were the unfortunates, the latter probably the more so because it was disqualified. The former is the Lexington, driven by John C. Moore, which was held ten minutes while its driver and mechanic each worked to replace a cotter pin that had dropped in the rear axle housing. The labor cost 2 points in scoring. The Chalmers received its very hard penalty for using a wheel secured from another Chalmers-Detroit to replace one broken. The rules explicitly covered the point.

In the same section there were three other penalties accorded to the Moline, driven by Gregory; the Maxwell, handled by Goldthwaite, and the Jewel, by Uhl. The Moline lost 29.5 points through the necessity of working upon a taper pin in the camshaft gear hub, the actual labor costing 13.3 points, material .2, and lateness at the finish 16 points. The Maxwell was held up to replace two spring clips, the penalty being 23.5 points, of which 21 was for lateness, 2 for labor and .5 for the material. The Jewel had a leak in its gasoline feed pipe from the auxiliary tank to the carbureter, and 5 points accrued through repairing it. Tape and soap were listed at .4, and the remainder as labor.

A single penalty was given in the Glidden class, that to the White steamer, of .7 of a point, .6 being for work in fastening a fender iron, and .1 for the wire.

On the Colorado Plains Numerous Morasses Were Partially Hidden by the Grass—Goldthwaite's Maxwell Found One of Them

Three Prize Winners of the Tour—Bemb (Detroit Prize); Winchester (Glidden Trophy); and Williams (Hower Cup)

OPINIONS VARIED AND INTERESTING ABOUT THE TOUR

F. B. Hower, Chairman of the Contest Board—"Of course, there will be another tour next year. Don't you believe that there won't be one. It always follows at this time that there must be a lot of talk about the event being the concluding one. The public may well invest in any car which came through this tour successfully with or without an absolutely perfect road score. This tour has been strenuous. The makers entered this tour primarily for publicity, but the experiences gained will prove of inestimable value in improving their product. The improvements in the cars of this tour will wipe out any little defects which may have shown, and when these improvements have been made the cars that are now competing will be ready for the proposed transcontinental contest of next year. I believe such a contest possible now, and in line with the desires of the makers. The question of season will have to be considered for the next tour, owing to the added time which will be required for its successful conduct."

Samuel B. Stevens, Member of the A. A. A. Contest Board—"The sixth annual tour has been a grand success, and I sincerely hope that there may be a transcontinental tour for 1910. The contestants in this tour did not fancy the idea at the beginning, but having won out with honors for all concerned in this event they now feel that the transcontinental is a possibility. Of course, the question of time enters into consideration. The proposed seventh annual could be carried through within a month I am quite sure. There would have to be two days lay-over each week to give time necessary for additions to the schedule in the event of bad weather. The real reason for the two-day stops at Minneapolis and Denver during this tour was possibly not generally understood. The extra days would have been utilized had the weather turned out bad. Regarding the rules for another year, I do not believe that they should be made easier at all, but I do believe that they should be made harder, if anything. The perfect car is not yet made, and may never be made, but we are fast reaching a point where confidence may be placed in any car. The troubles of the present trip have not been serious, and the makers who have had troubles, for the most part of the minor sort, will correct the defects for another year."

Charles J. Glidden, Donor of the Glidden Trophy—"Severe? Very severe hardly expresses it. The tour has been a hard test and a thorough test and a good one in every way. The showing for American cars has been immense, and I believe cars are now ready for the cross-country run. Early in the present tour many expressed the opinion that the longer tour would not be feasible, but after this 2,700-mile trip I believe that all think the time ripe for the greatest tour ever known, from the Pacific to the Atlantic. The transcontinental tour should precede any tour of Europe and will bring about a delay of the proposed tour of Scotland, Ireland and Wales, from Land's End to John O'Groat's. It may be possible that this will be in 1911, and again it may be better to tour the entire South before making the European trips proposed for several years."

Dai H. Lewis, Pathfinder of the Tour—"In my opinion, tours will go on year after year as long as there is a sale for automobiles. The great test of automobile construction is found on these tours, and the public and the makers want the tour. The present tour has been a grand test of construction and a great test of driving skill. The very fact that eight cars came through perfect in the road score and that so many came through with but slight losses due to minor defects is a great sign of the times. Cars are improving, as all will admit who took part or saw tours of days gone by. This tour was designed to bring cars through without a perfect score, and yet there are eight. It is wonderful, and it is evident that rules must be made ever more strict than has been the case in this tour. The idea of a transcontinental contest for next year is a good one, and if everything goes right I hope to be in this contest."

H. O. Smith, Chairman of the A. M. C. M. A.—"The 1909 Glidden has at least proven that the modern motor car can travel 2,700 miles at the rate of not less than one mile for every three minutes on the roads from Detroit to Kansas City, irrespective of weather conditions and without a repair or replacement or adjustment and without even tightening nut, bolt, or screw. The tour has furnished proof which should be worth to the manufacturer all the expense incurred and also supply information of inestimable value to dealer and to the individual purchaser."

W. H. VanDervoort, President of Moline Company—"I'm feeling pretty good, thank you, for we finished one car tie with the two Pierce cars for the Hower trophy, and had it not have been for a foreign substance that somehow crept into our gearbox we might have finished two cars. During our trip the Moline won honors by team work, for the cars always ran together unless in event of a puncture, and we had few of those, our Goodrich tires giving splendid service all through. The showing of the Moline this time has brought its reward, and I have already made three entries for the tour of next year, wherever it may go. I hope sincerely that next year's tour will be across the continent."

H. A. Croxton, President Jewel Motor Car Company—"We feel very well satisfied with the tour, and our showing is

really a surprise to us, as our cars were both new when they started and had received almost no test. We hurried to get ready. We shall be in future tours. The idea of a transcontinental tour for next year is a good one and our entries are ready now when asked for."

Webb Jay, Driver of No. 1 Premier—"The public will not appreciate what the cars have gone through on this year's Glidden. The going was certainly hard and the rules strict. If the dealers and buyers only appreciated what information they could get by the showing of the cars they would be surer of getting their money's worth and a satisfactory car. The Glidden was certainly strict enough this year to cause the makers to stop and think whether they had any real doubts about their car. It is, of course, worth a lot to win, but I think if I were a manufacturer I would go in to find out weak points so that they could be corrected. The stayathome kind of manufacturers don't always know how much trouble their cars are giving and why every car they sell hurts them instead of selling more cars. Every fellow who buys a half baked, unproven car hurts the auto business, for he does not fail to tell his friends that he bought a cheap car and one which looked the most for the money. He is the one who shouts about the unreliability of automobiles and how expensive they are. He tells of the upkeep expenses. I believe in touring contests under rigid rules impartially enforced."

J. Machesky, No. 105 Chalmers-Detroit—"It was rough to strike that last day just when things were coming along so nicely, and tougher yet to lose out almost at the finish. I had to change wheels with Harry Bill and was disqualified, yet the wheel of Mr. Bill had come just as far as mine, and he merely took a little time, put mine into order, and then came on. I went into the last day settled firmly in my own mind that I had a perfect score, but changing wheels cost me a position."

H. N. Searles, No. 14 White—"This has been a severe test, a contest in which the cars have been forced through difficulties never before experienced. The A. A. A. planned a tour to bring forth no perfect scores, yet eight cars had perfect road scores and many more lost but a very few points. The present tour has been to me a very agreeable experience with the exception of the special train in which the men were so herded together as to make things disagreeable."

John C. Moore, No. 114 Lexington—"This was all new to me and I am unable to make comparisons, but the trip was tough and hard. The day's runs were long and the strain on a new car was enormous, yet the loss of points to us was but 3.8. I am satisfied to have finished successfully, and feel that I could not have done better, as many well known and well tested cars were in the competition. The trip has been a lesson to me."

E. O. Hayes, No. 12 Midland—"You can bet it was a hard trip, and I am satisfied to have finished, let alone get prize honors. The Midland is ready now to enter for a trip across America, and with comparatively few changes. The long hard days, the rough roads, the stiff schedule and the going into unknown dangers over the treacherous roads was an experience I shall never forget."

C. E. Goldthwaite, No. 107 Maxwell—"As a test for cars the tour proved all that was promised and a little more. All honors go to cars that pulled through with a perfect road score. I believe now, as I did not believe before, that it will be possible to shape up a tour under even stricter rules for San Francisco to New York. That will be the supreme test and I hope to be able to take part."

F. A. Trinkle, Driver No. 103 Brush—"Any car that came through to Kansas City along the route of the sixth tour is a car that anyone may safely purchase. This has been a hard run for the little Brush, but I am satisfied with this tour, for in spite of the terrible going, more so for the little than the big car in this instance, I was not last."

Walter A. Winchester, No. 9 Pierce—"The tour was an interesting run, and I am satisfied that the roads, the stiff schedules, and the long runs each day brought out the best cars in America. I am ready now to tackle anything in the driving line. Variety was the point of this tour, for every class of road was encountered."

Frank E. Wing, No. 4 Marmon—"The trip was hard to a man accustomed to New England roads and to tours of the past. Taken as a whole, the roads were the worst ever known for a long tour, yet the schedules were stiffer than ever known and the runs of each day longer. The strain upon the driver and the car was terrible."

John S. Williams, No. 108 Pierce—"I found nothing so very hard about the tour, and was satisfied to drive steadily and only as fast as possible to obtain a commanding position and be ready for trouble. Going out ahead is breaking road and hard on the car, yet my Pierce gave no trouble and my tires gave none."

"Teddy" Dey, No. 8 Pierce—"I've been on them all, and for wear and tear on car and man, this was the limit. It was tough, and that is true. Steady work, hour in and hour out, won. I am ready to take a Pierce-Arrow anywhere that may be desired, and across America is satisfactory to me."

A. Y. Bartholomew, No. 10 Glide—"I had a streak of bad luck in certain particulars that took a great deal of the pleasure out of the contest for me. Next year we will be prepared for a transcontinental or any other kind of a hard tour. My car ran splendidly."

Walter A. Woods, No. 51 American Simplex—"Care was necessary, but constant vigilance earned its rewards. I lost out through the plunge into that hole which held fifteen men and in which the Brush stood on its head."

HOW RAPID TRUCK CLIMBED PIKE'S PEAK

KANSAS CITY, Mo., Aug. 1—Although the novelty of climbing Pike's Peak in an automobile has worn off since accomplished safely by a number of machines, no motor truck has ever attempted it before, and the Rapid truck in the tour justly earned great credit when the hard trip was successfully terminated. The start was made from the Antlers at daylight Monday morning, with T. P. Meyers in charge, Frank Grogan at the wheel, and Jim Curry as mechanic. Leaving promptly at 6:15, the eighteen-mile journey was nearly completed when darkness overtook the adventurous crew of the big machine, and they were obliged to stop and sleep on their arms, so to speak. Next morning, the top was plainly seen but three-quarters of a mile distant, this distance being completed easily by eight o'clock. The truck came down on its own power, finding this trip far easier than the upward one, which tested the nerve and skill of the driver to the limit. The Goodyear tires were badly cut up by the rocks but stood the journey and were used to the finish of the tour. It was certainly a strenuous test for a commercial car.

Rapid Truck Making Its Way Up Pike's Peak

HOW THE TOUR IMPRESSED ONE PASSENGER

By W. W. BROWN, President Automobile Club of Vermont.

I'm now arrived, thanks to the gods—
Through pathways rough and muddy,
Which surely shows that making roads
Is no' this people's study;
But though I'm no' wi' Scripture versed,
I'm sure the Bible says
That wicked sinners shall be damned
Who do not mend their ways.

THUS wrote "Bobbie" Burns after a drive over Scottish roads. I don't know whether the "sinners" who made these Western roads will be damned or not, but the roads themselves have been with all the fervency to be expected from men pounding nearly two hundred miles a day over them since July 12.

I have been asked for my impressions of the tour, from the vantage point of a passenger, and here they are, without fear or favor. I am in no way connected with the automobile business, nor the tour management. I paid all my own expenses and rode as a simple passenger, more or less accurately representing 125 pounds of sand. This was my first Glidden tour, and as a passenger I have had little to do except to keep my ears and eyes open to get all I could out of it, and I have thoroughly enjoyed every moment. I have met a lot of good fellows and been royally entertained.

W. W. Brown

The West is a great country, its people are cordial and open-hearted; everyone knows the reception we have had—it has been one grand ovation all along the line. But the country is all new and a bit raw, and with few exceptions the roads (outside of the large cities) beggar the name.

Any manufacturer who does not put a car in this yearly contest is missing something. I can see that the advertising for the cars in the run has been very valuable. The interest taken by thousands of future motorists during a three weeks' tour, covering seven great Western States, and passing through 336 cities and town, cannot fail to bear rich fruit. And they are buying cars. Little towns of three hundred people, with fifteen cars, is only one illustration of many I could give. Aside from the value of the advertising, it is the very best possible test that the manufacturer can get of the durability and efficiency of his car. Several builders of well-known makes and some factory superintendents and designers were driving their own cars in this tour.

One manufacturer and designer—and one of the brightest—told the writer personally that he had never been on one of these contests before, and that he would never miss another, as the experience was invaluable.

The drivers and their mechanicians, with few exceptions, were a conscientious, hard working lot of men—out to win; and the success or failure of any car depends largely on these men. I saw drivers who would smash up any car, no matter how well built, and others who would take most any car through safely. What knocks out many a car is the result of "speed mania" on the part of the driver. The time allowance is sufficient for reasonable driving. I know it creates a good impression on the public to come into controls among the first cars, but it militates against perfect scores. The observers—the most unobserving lot of men I ever saw—were all good fellows, but as observers there were many of them whom I should not want representing me and watching my competitors. It was the weakest point in the tour, and no one but the entrants themselves can be blamed.

I rode in the same car all but two days; the observers were changed every day. One said to me as we started: "Think I'll look over the rules; I haven't had a chance to read them yet." In questioning another as to how he came to be appointed, I found he was a friend of the entrant he represented and wanted to go on the trip for the fun of it. Another slept. I would give big money if I could sleep as that man did. I believe we could have put on a new spring and he still would have slumbered on.

Another said to me: "I use my own judgment; I don't follow the rules." Still another left the car with the driver and mechanic oiling up. They could have tightened up or made other little adjustments, though fortunately, or unfortunately, there was nothing to do on the machine.

Now don't imagine there were no competent observers. I know there were, but they should all be competent.

The tour was exceedingly well managed from start to finish; everything ran without friction, and when one considers the immense amount of detail involved, this is really remarkable. All moved like clockwork; there were no hitches, no delays. The route was well and carefully laid out and marked.

The contest committee hear observers' reports and pass judgment without knowing which car is in question. The chairman of this committee, the one dominant figure in the management, is a man with great executive ability, absolutely honest and fearless, doing at all times what, in his judgment, is best and right. A little more tact and consideration for others would, however, smooth his path a whole lot.

The gentlemen in charge of the hotel accommodations gave us the best which the several towns and cities afforded. They could not make bathrooms where baths there were none, nor change the hotel management; but we were as well taken care of everywhere as was possible.

The Pullman train of sleepers and dining cars were a decided success and reflected credit on the mind which conceived the idea. There were one or two disagreeable features incident to such an arangement during the hottest season in a hot country, but those who had been accustomed to travel and its consequent discomforts united in saying that the scheme was admirable.

There was a very general opinion among the men that favoritism was being shown a certain make of car. I know this to be false. It is true that in the early contests there may have been grounds for such a feeling, but there is no one connected with the present management who had anything to do with these earlier tours. But the car and the committee still get knocked. The car is a high-priced, well-designed, well-built car, with a well-organized crew, and is a logical winner under rules which compel low-powered, low-priced cars to compete on nearly even terms with cars of greater power and more expensive construction.

The rules under which this contest was run were formulated by a committee from the National Association of Automobile Manufacturers, working in joint session with the contest committee of the A. A. A.

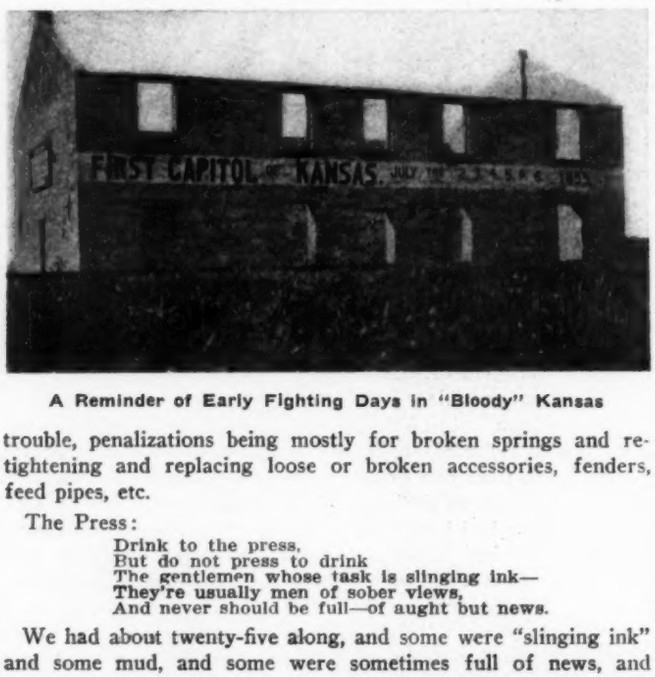
The crews on the cars did a lot of talking about these rules, forgetting that they were formulated by representatives of the entrants themselves. Undoubtedly these rules are capable of betterment, but each car was entered with a full knowledge of the rules and "kicking" was a great waste of breath. However, it seems to be the opinion of the most experienced and thoughtful men that there was still too much laxity in the rules, and that penalties should be imposed for all adjustments, whether of

Teddy Day In No. 8 Pierce Following the Monotonous Prairie Road Through Eastern Colorado

carbureters or ignition system, or accessories, and that there should be a record kept of gasoline, oil and water consumption.

There is only one possible exception, and that is the adjustment of brakes, as a matter of safety, as drivers would run with brakes all gone rather than incur the penalties imposed for their adjustment.

The weaknesses developed in the contesting cars by this trip will be shown by the reports of the contest and technical committees. To an onlooker there appeared to be very little motor trouble, penalizations being mostly for broken springs and retightening and replacing loose or broken accessories, fenders, feed pipes, etc.



A Reminder of Early Fighting Days in "Bloody" Kansas

The Press:

Drink to the press,
But do not press to drink
The gentlemen whose task is slinging ink—
They're usually men of sober views,
And never should be full—of aught but news.

We had about twenty-five along, and some were "slinging ink" and some mud, and some were sometimes full of news, and some were sometimes full of —— If you can think of any suitable rhyme fill it in. The gentlemen of the press were like any other group of mortals, all kinds, but mostly good fellows.

Some of the Contestants "Talking It Over"

The representatives of the strictly automobile publications have done some "classy" work, and should be proud of it. But oh, you press men—who write stuff to fill space in the dailies, why cannot you give us something near the facts? Of course, we dont expect too much, but just get *near*, and couldn't you cut out the slush? This isn't my game, and I may not know what I am talking about, and, perhaps, the great benighted public wants that kind of "dope"; at any rate there was a lot of appallingly inaccurate news dealt out every day about this tour.

And now before I go back to the hardware store with my hammer, just one word about the "grumblers." Fault-finding, as a rule, is a pretty good proof of lack of knowledge or experience. The man who lives in luxury at home, or who is widely traveled, learns to accept conditions as he finds them on such a trip as this and make the best of everything. The strain of the long, gruelling ride began to tell on the nerves of the men, and toward the end of the run there was a good deal of "kicking" about things that would not have ruffled them at the start. You can't drive two hundred miles a day, over rough roads, and then be out with a "Floozy" all night, or attempt to fill a contract to make a dry town out of a wet one and then get up at 5 a. m. and find the steak tender and the service prompt.

The cup donor, Mr. Glidden, who has been on every tour, was with us every day, a most genial gentleman, meeting old acquaintances and making new ones everywhere, always thoughtful and courteous, making his speeches short and his hand-clasp long—a prince of good fellows!

And now it is all over and up to the technical committee (whom may Heaven protect), and the drivers, mechanics and observers are up in the convention hall, where the battered, "throbbing monsters"—see daily papers—have ceased to throb and are receiving bi-manual examinations by the two gentlemen constituting the committee, preparatory to being operated upon for the complete restoration of their mechanical health, while I am sitting, this scorching Kansas afternoon, in my hotel bedroom with my Apollo-like figure decorated with a fountain pen and a briar pipe, pushing the one and pulling the other and computing the fabulous price I would willingly pay for a long draught of cold, clear Vermont spring water.

KANSAS CITY, MO.

Hotel Accommodations Handled by an Expert—One of the hardest jobs in connection with the big tour is the apportioning of sleeping accommodations. The man who handled the task this time was Glenn A. Fargo, of the Hotel Lafayette, Buffalo, and while it is true that he, like all others who preceded him on the job, had some kickers, it is a fact that his work gave greater satisfaction than has ever been experienced before on the tour. He preceded the tourists as long as they were booked for regular hotels, and from Fort Dodge to Kansas City he was major domo of the moving Pullman hostelry.

NOTED AT THE TOUR'S CONCLUSION

Why Hower Used the Train—It seems that Chairman Hower is one of those who suffer much from hay-fever, and the dust of the road aggravated the complaint excessively. Hence the chairman had a very good excuse for his frequent utilization of the train, and thus had the opportunity of enjoying his private car a la Harriman.

Detroit Trophy Winner Used Diamonds—Diamond tires are represented in the winner's list by the Chalmers-Detroit car which captured the Detroit trophy for toy tonneau cars. There were twelve cars to start with Diamond equipment, one of them with solids, but for reasons which had nothing to do with tires, three dropped from the ranks en route. Nine cars finished with the Diamonds, two of them with perfect scores.

Tour's Physician Was an Observer—This was the first national tour in recent years in which there has not been a regularly appointed surgeon riding behind the contestants. The medical honors of the 1909 tour belong to Dr. T. F. Seymour of Mishawaka, Ind., who rode as the observer from the American Simplex interests. His compact medical case was called upon many times by the tourists en route with successful results.

Goodrich Tires on Glidden and Hower Winners—From the point of tire equipment the Goodrich Company was again successful in the winning of the Glidden end, for the third time, the Hower trophy. In this year's contest twelve cars started with Goodrich tires and every one of them finished, six having perfect scores. On the dozen cars there were but 17 punctures among 48 tires, and the long hard days of driving over rough roads made the trip a thorough test upon them.

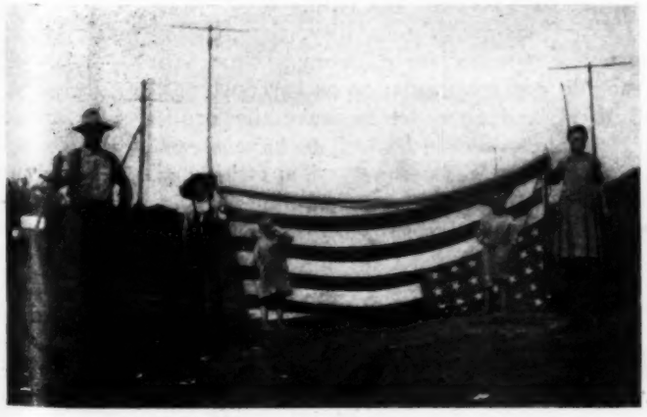
Samples of Kansas Wheat—Soon after crossing into Kansas, one enterprising wheat-grower, J. E. Fitzgerald, of Weskan, saw to it that some excellent samples of Red Norway spring wheat were tossed into the passing cars. It is not positively known, but it is among the possibilities that some of the 1909 Gliddenites may later be found located on Kansas farms, for Mr. Fitzgerald stated that the samples donated were from seed sown in the last week of April, which meant a great yield for three months' growing.

"The Transcontinental Tour is possible now," said George Schuster, winner of the Around-the-World race, "for cars have passed through hardly more in this tour than they will be called upon to go through in a trip from coast to coast. It is evident that the rules will have to be made even more strict, and I believe that cars should never finish with a perfect road score after breaking parts on the road that are not repaired. For instance, one car broke a spring, and drove through without repairs, securing a perfect road score. Road breakages when not repaired should bring a penalty immediately and put that car out of the perfect list at once."

The Steamer Which Used Kerosene—A feature watched with special interest was that the White Steamer used kerosene, or "coal oil," instead of gasoline. The new fuel worked splendidly throughout the long journey, and claims made in its behalf were well proven. First of all, as regards cheapness, the White driver secured kerosene all along the route from 6 cents to 10 cents cheaper per gallon than was paid for gasoline. Secondly, the new fuel was handled without any precautions, and it was not unusual to see kerosene being poured into the fuel tank while the crew of the car and an interested crowd stood by with lighted cigars and cigarettes. At the finish of the tour the White was the only car permitted to enter Convention Hall, where the technical examination took place, without draining its fuel tank. Thirdly, the new fuel proved to be absolutely without smoke or smell. Fourthly, kerosene could be purchased at whatever part of the route was most convenient, and not once during the trip through the ten States of the Middle West was there found a grocery store where kerosene was not readily and cheaply obtainable. Finally, the amount of fuel used on the trip showed that kerosene is at least fifteen per cent. more efficient, gallon for gallon, than gasoline. The car in other respects made a most creditable showing. The only adjustments or repairs charged against the car were tightening a lubricator pipe and wiring a damaged mudguard. These penalties were not inflicted until more than 2,000 miles had been completed with an absolutely perfect score.

Brush Runabouts with a Self-Explanatory Sign

Bernhart's Jewel, Which Survived Rough Roads Creditably



A Patriotic Plainsman and His Growing Family

The White Sends Out a Warning to Those Behind

THE AUTOMOBILE

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H. M. SWETLAND, President
A. B. SWETLAND, General Manager
231-241 West 39th Street, New York City

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1909'S TOUR AND 1910'S TOUR

Never before, here or abroad, were automobiles subjected to such a severe, prolonged, and diversified test as that necessitated in the A. A. A. endurance tour which came to its conclusion Friday last at Kansas City after fifteen days' running. Any car surviving this arduous reliability examination, with or without excessive penalization, need have no fear of meeting the requirements of owners who demand vehicles of no uncertain manufacture, capable of withstanding unusual and unexpected strains, and at the same time possessing speed in quantity sufficient to satisfy any reasonable man who does not use the public highway as a race course.

The concerns which openly proved the worth of their products in the tour just ended will profit commensurably by what their cars accomplished, to say nothing of the great cumulative value which follows as a sequence of the multiplied repetition of the names in print. Unconsciously, the public associates almost in a class by themselves, those cars which participate in national events.

But the 1909 tour had a disappointing entry, and reasons therefor are not all agreed. Through experience one learns—and this sixth tour of the governing organization will enable a better reliability to be conducted another year—if one is wanted. If a big endurance tour is still an asset to the industry—and we are inclined so to believe—it deserves a more unanimous support from the trade than was accorded this year. To secure this endorsement it would appear that the thing must be gone at in an entirely different manner.

Let us start out on the supposition that twenty makers believe in a national tour of some kind; exactly what, would have to be settled at a conference called for the purpose. It is decided that the industry can well afford to support such an event, and that all engaged will have a chance to benefit in a more or less degree, it being taken for granted that winners will profit the most from a publicity consideration.

It being the unanimous sentiment of the twenty that a tour is wanted, the twenty then and there guarantee one or more enteries, and furthermore deposit one-half of the entry fee. This would insure a representative field and add substantially to the benefits accruing.

Then would come the drafting of the rules, and such a drafting as would leave nothing to the discretion of the contest committee except the enforcement of the plainly worded regulations;—no handing to contestants penalties decided upon at the eleventh hour.

And right here it is urged that the tour be divided into two distinct departments, one having to do with the business direction of the event, and the other to be concerned solely with the competitive feature. One man should not dictate the entire situation, no matter how well he might be qualified for the position, for in this American republic there is an inbred dislike to monarchial control. It does not always follow that a good business man is equally successful in looking after details of a technical nature, which in their entirety should be left to a competent committee, without any possibility of interference from any other source. This is a vital point in connection with another tour.

It is a foregone conclusion that microscopic examination at the end of a tour can be utilized in bringing about the selection of so-called final winners. But some method should be evolved whereby first-class certificates should be issued to all contestants finishing within a maximum loss of points, say not more than one hundred, for the entire tour. In other words, this would mean a physical catechising of the cars such as would require a degree of reliability sufficient to satisfy even the most exacting buyer of an automobile.

In any sort of an examination very few ever pass at 100 per cent, and consequently it is logical that machinery, in its performance, should have the same kind of a chance as man, and all the glory of the tour should not go to the car which perhaps may have been a little more fortunate than the others in escaping ruts and stones that bestrew the path.

Coincident with reliability, the general public is beginning to associate economy. Next year's run should include exact information as to consumption of gasoline and oil, and, in order to make the figures more understandable, it would be well to have the contest an exact distance, say 5,000 miles. Thus the cost per mile per passenger, and all sorts of newsy statistics, could be extracted from the results of the tour.

But, first of all, let the manufacturers themselves decide as to whether they want a tour, and until then the A. A. A. should decline to go forward until it is evident that its services are desired. At the same time, no one questions but that the enforcement of the rules, after made, should rest entirely with the contest committee of a disinterested organization.

Characteristics of Piston Rings

Chapter IX

LEAKAGE by the pistons in cylinders of motors is one of the difficulties which is prone to manifest itself as the product of wear in regular service after a time, and even in new motors unless the work is most carefully done. Compression, which makes for power next to a balanced fuel mixture more than any other one point, will be lost if the piston rings are not tight, owing to the clearance which must be given to pistons, in view of the great heat raise and temperature variations as well.

To a vast extent the life of motors in actual service is coupled to profuse lubrication, using suitable grades of lubricant for the purpose, but the piston rings must be properly made, of proper materials, and nicely fitted as well, in order to make care and lubrication worth while. Trouble from inferior piston rings will be the most conspicuous when the compression is high and when the speed is low. This follows, since if the compression is high the explosion pressure will be much accentuated, and the higher the pressure the greater will be the pressure leak, heat change, difficulty in lubricating, and wear on the rings. If the speed is low, the time for the compressed charge to leak by will be prolonged, and, incidentally, if the stroke to bore is relatively long, the time will be prolonged on this account.

From what has been said, then, it is plain that the piston ring question becomes of the greatest importance in connection with long stroke, high compression, relatively slow speed motors, and granting that this type of motor will afford an increased energy output under refined conditions; even so, if the work is indifferently done the results will be disappointing.

Success Depends Upon Quality of Material—While rings are made of cast gray iron, even so, the quality must be of the finest. The castings from which the rings are turned may be in the form of a tube long enough to allow of turning out enough rings for a motor, and in a "six," if the rings are 5-16 inch face, using four to the piston, considering the material wasted in cutting off, the cast tube will have to be at least eight inches long, to which must be added the "accommodation" pieces, by means of which the tube is held in the jaws of the "chuck" of the lathe. Other length will be in proportion.

If the rings are to be 1-4-inch radial thickness when finished, the radial thickness of the tube must be more by an amount sufficient to assure that the rings will finish up. It is desirable to limit finish, since the superior metal will be found close to the surface of the casting. If 1-16 inch is allowed for finish on the exterior as well as interior of the cast cylinder, and if the walls are of uniform thickness all over, there should be little trouble in turning out good rings, provided the castings are poured from a good cupola charge, at the right time, at the instance of a "gaffer" of skill.

Rings Are Turned to a Greater Diameter—Since the finished rings must be of greater diameter than the bore of the cylinder by an amount equal to the difference in diameter of the bore and the piston, plus the amount of spring required in the rings to cause them to press against the cylinder walls firmly, they must be finished to a greater diameter, after parting, when the slip joint is made. This is done in a clamping chuck, and the same chuck serves for grinding the surfaces of the rings in the finishing process.

Extract from Vol. 1., Part II., Chapter IX., of a set of books, in preparation, by Thos. J. Fay, covering all phases of automobiling, from the point of view of designers, constructors and in actual service.

Grinding Is Necessary if Results Are to Be Good—Rings are usually ground on their faces by means of a special tool in which a magnetic chuck is the conspicuous feature. It would be very difficult to hold the lighter types of piston rings in any other form of chucking device, and even in the hands of machinists of great skill the rings would probably deform as a result of jaw chucking. The magnetic chuck alters this, and all that remains is to grind the surface of the rings after they are "parted" from the cylinder from which they are being made, and at the slip joint. Considering this plan, the rings are first reduced to near diameter in and outside (allowing about 0.010 inch for grinding) in the wroughing process.

Grinding is of the greatest advantage, especially in connection with cast iron, which is not of uniform texture, owing to the presence of a certain amount of white iron, which is very hard,

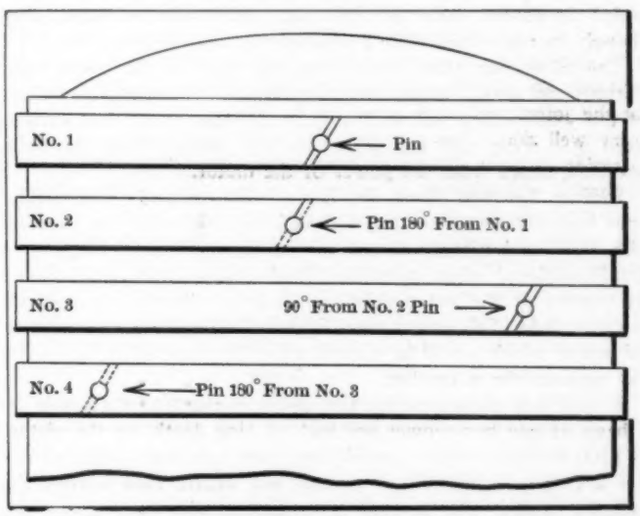


Fig. 1—Rings are placed to break joints and prevent direct leakage

and the effect of these hard zones, since the tool is prone to back off as it enters them. This is not, under ordinary conditions, a matter of great moment, but in piston ring work, since the rings have to be accurately made if they are to be of the greatest utility, grinding is the best practice.

Rings Are Pinned to Break Joints—Referring to Fig. 1, it will be observed that the four rings are so placed on the piston, in the ring groove, that none of the ring joints is in the same vertical plane, nor is the distance between any two joints less than 90 degrees. The joints of the second and fourth rings are shown in dotted lines, and in the first and third rings the pins show at the joint sufficiently plain to indicate the manner of profiling the rings in order to accommodate the pins.

There is some chance of the pins drifting out if they are not a drive fit, and that this work should be done by a fitter of more than ordinary skill is indicated by the amount of damage that a pin, if it drifts out, will do to the bore of the cylinder. If the dowel pins are made with two diameters, as shown at F, Fig. 5, they will be locked in place, since the shoulder on the pin, if the pin starts, will intercept the ring and be prevented from drifting further. Dowel pins are usually about 1-8 inch in diameter, made of Bessemer rod, and carefully hand fitted, in

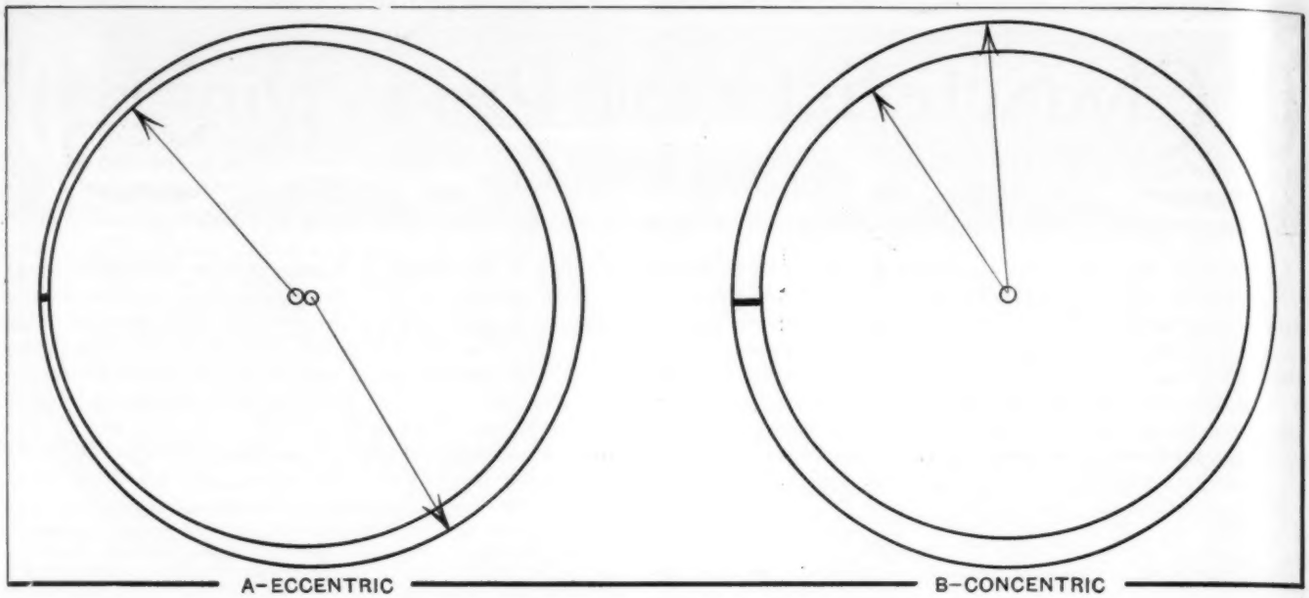


Fig. 2—Eccentric rings are designed to afford an even pressure, and concentric rings are peened to afford the same results

order to render them so tight that they will not start, even though they are fitted with a shoulder for locking purposes.

The mere fact that dowel pins are used at the joints constitutes no good reason for carelessness in fitting the rings at the joints; they will leak a little, perhaps, when the work is very well done, and any such leak will detract from the compression, hence from the power of the motor.

Spring Tension Must Be Equal All Around—The difference between rings, as used for packing, in motors for automobile work and motors in general lies in the use of rings of a small sectional area, carefully fitted. Since the piston speed of motors of the automobile type is even above 1,000 feet per minute, under full power conditions, it follows that the amount of power which would be wasted were the rings to press heavily far exceeds the allowable.

A very fair allowance for the power consumed by rings is on a basis of one horsepower per inch of ring depth, on the piston, at 1,000 feet per minute, considering a six-inch bore, which allows for a ring pressure of ten pounds per square inch against the cylinder walls. The several investigators who have given the matter attention report losses even as high as one and one-quarter horsepower per ring, which must show excessive pressure and inferior fitting when the loss is so great.

Some rings are made eccentric, as shown in A, Fig. 2, and the amount of eccentricity differs as between the several examples over broad ranges. The idea is to afford equality of pressure without having to do much fitting, and that the plan has considerable merit is generally believed. As a general proposition the difference in ring thickness due to eccentricity is in the ratio of 1:2, and since many motors are fitted as depicted in B, Fig. 2, with no difference in thickness of the rings, it follows that the only danger lies in having the rings thin out too much.

When the rings are concentric, as shown in B, Fig. 2, it is the practice to "peen" them in order to lay the fiber, relieve the internal strains, or so distribute the ability of the metal as to render it capable of pressing out equally at all points in the diameter. For this purpose a peen hammer, in the hands of a man of skill, is used to peen the rings by striking against the inner surfaces at equi-distant points. The blow must be carefully regulated and the backing must be rigid, in order not to fracture the rings. The process is one of compression, and by bruising the metal at equi-distant points it may be shaped in or out to suit the occasion, and the amount of pressure the ring is to exert may be regulated by this process.

Joints Are Made in Divers Ways—Referring to Fig. 3, A represents a joint which finds a place in many makes of motors, and when the surfaces are parallel and closed, as shown at B, when the piston is in place and "hot," it works very well. The overlap joint, shown open at C and closed at D, is probably better, since the parallel surfaces of the joint will help to main-

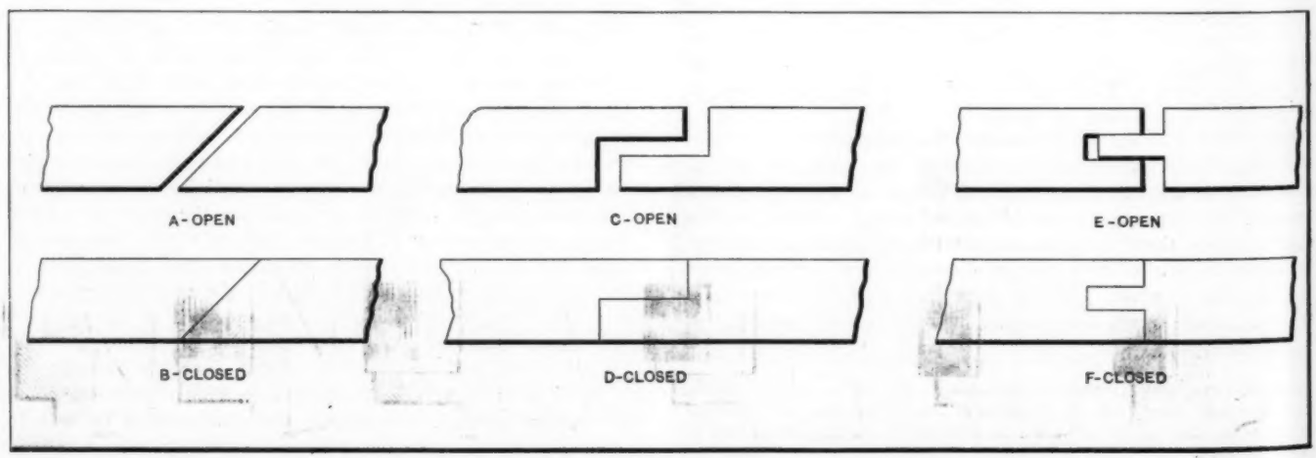


Fig. 3—Slip-joints of rings are made in divers forms, all with the idea of defeating leakage at joints as well as around the bore

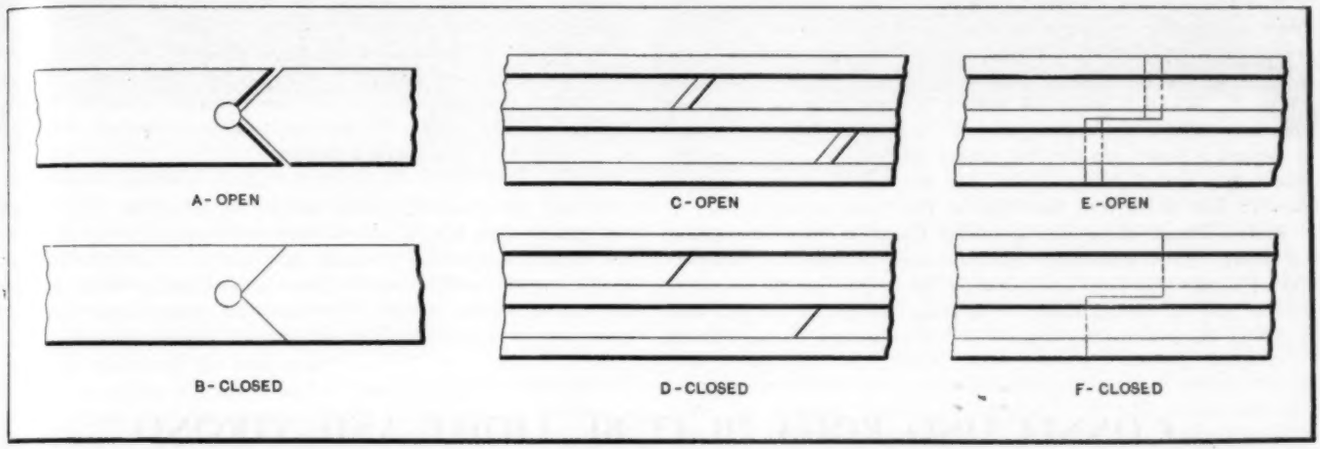


Fig. 4—Other forms of ring-joints, some of which are much in vogue, and others but little used

tain tightness, without having to figure upon the difference between cold and hot conditions, which is a difficult matter. This joint requires good fitting, or the surfaces at the joint will fail to be tight, but the joint, E, in the form of a tongue, is even more difficult to make, and it offers no advantage over the one previously mentioned, for the reason that there is but one set of surfaces in contact when the piston is traveling in one direction; this joint is shown closed at F.

Fig. 4 represents another series of joints, and A represents a modification of A, Fig. 3, which modification is without special merit, although it is probable that this joint will work very well when the fitting is well executed. A joint which is used in compressed air work more than in motors is shown at C, D, E and F, Fig. 4, and it is really a nest of rings, with one large ring supporting two smaller ones. The two smaller rings are shown open at A and closed at B; it will be observed that they do not have their joints in the same vertical plane, and the joints should be spaced at least 90 degrees from each other around the piston. At E the joint of the master ring is shown in the open position and closed at F. This joint is designed to come at a point remote from the joints of the nest of enclosed rings. In this way any leakage at any one joint will be headed off, since it will have to pass around the piston at least 90 degrees before it will intercept another joint. Time is a great factor in this class of work, since, if the leakage is impeded, the piston will perform its functions ere the leakage will diminish the power to a material extent.

Bearing Surfaces Must Be Parallel and Close—The rings, to be tight, must press against the walls of the ring grooves on the top and bottom sides alternately, depending upon the direction of travel of the piston. For tightness all depends upon the quality of surfaces and parallelism. The rings must not press against the radial bottom of the groove, and in order to prevent this the groove is made deeper than the thickness of the rings in the radial plane. The difference may be even 1-64 inch, and it is also true that the rings will not press against the top and bottom faces of the grooves simultaneously, since they must be free to move, in order that they will accommodate themselves to the differences in diameter of the cylinder and to the lateral play of the piston, which may not be without clearance.

Fig. 5 depicts the relations, and clearance is shown back of the rings. When the piston is in place in the cylinder the rings protrude a few thousandths of an inch, depending upon diameter and temperature, but when the piston is out of the cylinder the rings protrude considerably, which is an indication of the spring tension of the rings against the walls of the cylinder. If the rings do not protrude when the piston is out of the cylinder it is a sure sign that they will fail to perform their allotted functions when they are in place. In the process of peening it is the aim to make this difference such that the rings will press evenly all around against the walls of the cylinder when the piston is in place, but it is not desired to have the pressure above, say, 10 pounds per square inch. If, in peening, the rings are damaged even to a slight extent, it is necessary to scrape them to a true bearing, and in some shops they are scraped (even if the grinding process is well done), besides grinding. That a skilled workman will be able to make a good fit by scraping is proven by the good performance of many motors in which hand fitting is resorted to, and despite the use of special machinery in the process, it is proper to consider a certain amount of hand work. Damage, more than advantage, will follow, if the workman who is awarded the task of scraping is lacking in skill in the process. Even if the artificer is skilled, the facilities must be in keeping with the exacting nature of the work to be done, in order that the results will be up to a fitting standard.

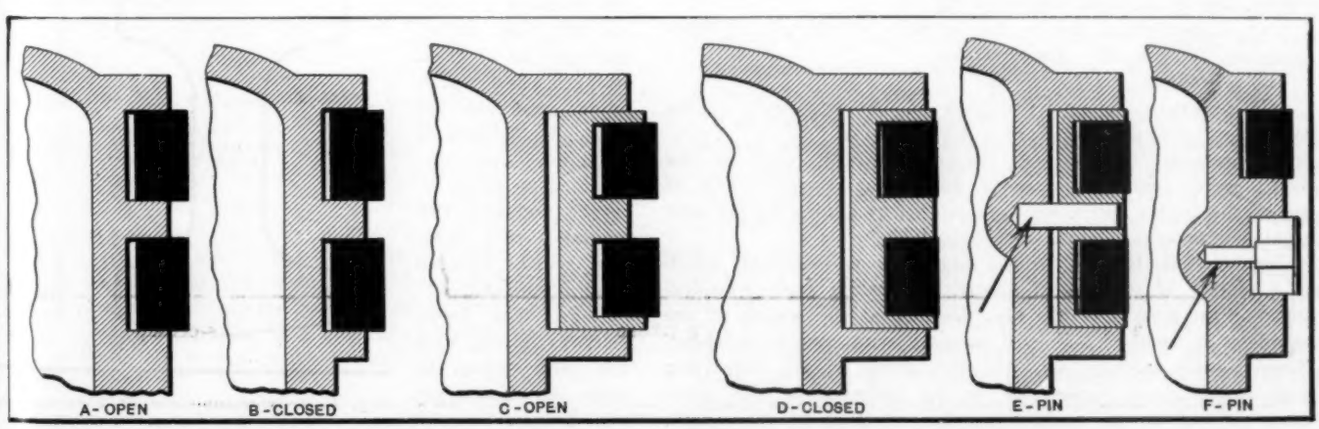


Fig. 5—Sections of pistons showing clearance back of rings and means for fastening dowel pins in place

In Fig. 5, A and B depict individual rings, of which at least three are used on each piston, and at E a dowel pin is indicated, which has the facility of preventing the ring from floating around so that joints will ultimately come in the same vertical plane. C, D and E show the nesting system of rings, indicating clearance behind the master, as well as behind the nested rings. E depicts a dowel pin for the master ring, and it will be understood that dowel pins are used for the nested rings at proper points; they fasten into the metal of the master ring.

Piston Rings Must Be Carefully Handled—In the process of fitting, if the artisan is not dexterous, they will be "sprung" out of shape, and when in place will fail to conform to the curve of the bore of the cylinder; if the rings are gently pressed over a set of thin, wide, flat blades, and thus sprung to a sufficient diameter, uniformly all around the circle, they will slip over the piston and into the slot without being damaged.

If they are fitted by a man of great skill and a certain amount of scraping is done to render them fit, they will have to be removed and replaced a number of times, and the chances of doing damage are very great; the process, as above indicated, will abort such tendencies to a marked degree.

A close scrutiny of the finished rings is essential to good success, and the inspection department, in the shops which turn out quality cars, are fitted out with facilities such as will enable the inspector to arrive at exact conclusions. A microscopic examination of the materials is also of value, and conclusions may be reached as the result of comparison, using a specimen, of known quality to go by.

CONNECTING RODS MUST BE LIGHT AND STRONG

BETWEEN the crankshaft and the piston for each cylinder of a motor, it is necessary to employ a connecting rod, and in view of the inertia effect on the mass, following rotation, and reversal of direction of motion, it is necessary to design the parts in such a way as to limit weight, or else the stresses in the section of the crankshaft will be such as to limit the speed, hence power, of the motor.

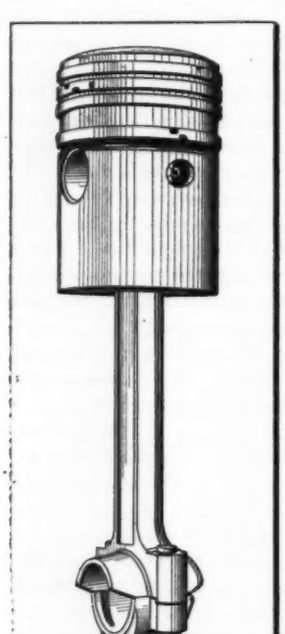


Fig. 1—Conventional design of connecting rod and relating parts in place

Fig. 1, depicts a design of connecting rod, of the I section, with every evidence of lightness, and strength at all points conforming to the requirements. The crankpin end, which is most likely to influence the results, is made light by using two bolts, and cutting away the cap, on which pressure is relatively light. At a point, 6-10 up from the center of the crankshaft bearing, the section with relating proportions, as shown in Fig. 2, and the taper of the connecting rod is on a basis of 3:2 from the crankshaft end.

In many examples of good connecting rods the cap is bolted on by means of four bolts, rather than two, as shown, and the cap is extended out in replica of the half of the bearing on the connecting rod.

Connecting Rods are Subjected to Various Influences—Compression, tension and flexure will be present in these members, in magnitude, depending upon the following:

(A) Compression due to the pressure of the gas, in compression, and on the power stroke.

(B) Tension, due to inertia.

(C) Flexure, primarily in view of the angularity of the connecting rod, and again, in a kinetic sense.

Compression, due to gas pressure, will decrease as the speed of the motor is increased, due to the restricted flow of gas at the higher speed, which is proven by falling torque with increasing speed as shown by a torque test.

Tension will decrease as the angularity is increased, which is a matter of the use of shorter connecting rods, considering a given stroke; it will also decrease as the weight of the members is reduced. It will increase with increasing speed. Tension will decrease with the shortening of the connecting rod, for a given stroke, due to the influence of side pressure, as well as on account of the reduction of the weight which naturally follows if the length is very much reduced.

Flexure will increase as the connecting rod is shortened, for two reasons: *a*, in view of increased angularity, and *b*, following augmented side pressure. Ability of the connecting rod to withstand flexure increases as the rod is shortened, so that a compensation is introduced by the very method that brings on the tendencies.

Rational Column Formula, Involving Least Radius Gyration—If the material is drop-forged mild steel of a good selection, the constants for wrought iron will serve very well, and the formula may be written thus:

Let,

p = ultimate strength per square inch.
l = length of connecting rod in inches.
r = least radius of gyration for the section.

when,

$$p = \frac{40{,}000}{1 + \frac{1}{20{,}000}\left(\frac{l}{r}\right)^2}$$

Since the above formula solves for the ultimate strength it is necessary to consider a factor of safety, and in view of the ills of excess weight, this factor should be limited, which may be done if the material used is from a careful selection. A factor of safety of 4 would seem to be adequate.

The Use of Bronze Is Deplored—Under no circumstances can the use of bronze for connecting rods be justified; it is high priced; of limited kinetic ability; likely to hold hidden flaws, and limited in ability from the point of eccentric columns. Die frogings of steel are not high priced, they may be of great strength, and under proper conditions the machining process is a simple operation, attended by great accuracy, and with full assurance that "wasters" will be reduced to an infinitisimal percentage. The formulae, as given, may not, with safety, be used in connection with bronze.

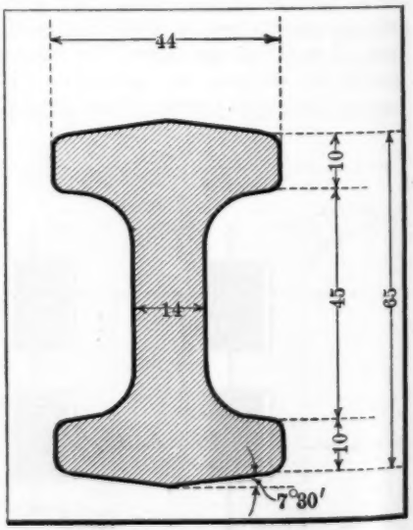


Fig. 2—Economical form of I section as used in connecting rod work

SCIENCE OF JUMP SPARK COILS

By J. A. Williams

AS used in gasoline engine ignition, the jump spark coil occupies rather a neglected place in the art. The reason for this lies in the fact that because it is apparently a very simple piece of apparatus, and the principles under which it operates are supposed to be so well known, comparatively little electrical engineering thought or effort has been applied to its development along the best lines.

It is generally supposed that a jump spark coil consists of a core of soft iron wires, surrounded by a primary winding of comparatively few turns, which is surrounded by a secondary winding of relatively a great number of turns, a vibrator for interrupting its circuit, and a condenser for absorbing the extra current of induction, as it is called, or the spark at the points. This definition seems to pretty thoroughly cover the average man's idea of a jump-spark coil.

The jump-spark coil when properly designed and constructed, and used in connection with the proper system of jump-spark ignition, will do even more for stationary engines than it has for the automobile or motor boat.

The difficulties to be overcome in automobile ignition are relatively easy, as compared with the conditions to be met with in stationary engines. Practically all automobiles have reasonably low compression and use mixtures quite rich in gasoline vapor; for economy of fuel in the automobile art has not been considered a necessary factor, and it has been partly sacrificed in order to obtain greater reliability.

In the modern engine, compressions have been carried to the very limit permissible with the kind of fuel used, with the end in view of getting the greatest possible fuel economy throughout all the various ranges of load.

The iron wire core consists of a bundle of soft iron wires and occupies axially the central position in a spark coil. The iron wire used should be extremely soft, possess great magnetic conductivity, and the property of instantaneous and complete demagnetization. The function of the iron wire core is to receive from the primary winding and store up in the form of magnetic energy, the electrical energy that is applied to primary winding.

The primary winding consists of a few turns of heavy, well-insulated copper wire of high conductivity. In the usual coil it consists of from 200 to 300 turns. The function of the primary winding is to receive the battery or magneto current and circulate it around the iron wire core, so as to charge it with magnetic lines of force. Furthermore, it has an additional function in acting as the primary winding of a transformer when operating under the condenser discharge and producing a secondary spark in the secondary winding.

Very Many Turns to the Secondary—The secondary winding consists of a great many thousand turns of very fine silk insulated copper wire and surrounds the primary winding. The function of the secondary winding is purely that of a transformer, as it multiplies the voltage of the primary winding and at the same time reduces the amperage in a ratio entirely dependent upon the number of its turns, as compared to the number of turns in the primary. For instance, if there are one hundred times as many turns in the secondary as there are turns in the primary, then there will be one hundred times as many volts in the secondary as the condenser discharge delivers to the primary winding and conversely one hundred times less amperage in the secondary winding than there are amperes passing through the primary, due to the condenser discharge.

*Extracts from a paper read before the National Gas and Gasoline Engine Trades Association, South Bend, Ind., June, 1909.

The vibrator of a spark coil consists of a stationary electrode which is tipped with a platino-iridium point and a movable or vibratory electrode which consists of an iron wire core and is held by spring tension away from the iron wire core and keeps its own platino-iridium contact in firm contact with the platino-iridium point of its stationary member. The function of the vibrator is purely that of a circuit breaker. It simply breaks or interrupts the primary current and stops the flow of primary current when the iron wire core has been charged sufficiently strong with magnetism to produce a satisfactory secondary spark.

The condenser consists of a number of alternate layers of tin foil and mica, or tin foil and properly prepared paper. So many of its sheets are positive, are connected together, and lead to one electrode of the vibrator. An equal number of its sheets are negative, connected together, and lead to the other electrode, but are insulated from the positive sheets by means of mica or paper, but usually the former.

Functions of a Condenser—The function of the condenser is not, as commonly supposed, merely to stop the sparking at the platino-iridium points when they interrupt the current. True, it performs this function, but merely incidentally. Its true function is to receive the kick of the coil, thus receiving and storing the impulses of electricity generated in the primary winding by the rapid demagnetization of the iron wire core upon interruption of the primary current, then instantly surge or throw this increased amount of electrical energy through the primary winding.

This is the principle that all dynamos or mechanical generators of current operate on. It isn't the mere fact of possessing lines of force threaded through the axis of the winding that creates a current, but it is the rate of change that produces current. An increase in number of the lines of force will produce an increase of voltage or current in the opposite direction. We therefore see that the rapid abstraction or accretion of lines of force will set up a powerful electromotive force or voltage within the primary winding. This electromotive force charges the condenser with a heavy current of strong voltage. The condenser in turn reacts in the opposite direction and sends a strong current through the primary winding, which in turn demagnetizes the iron wire core. It in turn rapidly demagnetizes and sends a surge of current back into the condenser, thus creating an oscillatory effect. This produces by induction several surges of current back and forth through the secondary winding.

Now as the turns of wire in the secondary winding of this particular coil are one hundred times greater than the turns of wire in the primary winding, the voltage in the secondary winding is one hundred times greater than the voltage set up by the discharge of the condenser in the primary winding, and is of sufficient strength to jump a long air gap or to shoot the compression in the cylinder of a gasoline engine.

It is common knowledge that the arc produced by a kick coil between the electrodes in the cylinder varies from 75 to 100 volts, according to the size of the kick coil and the amount of current used in charging it, yet the battery that is charging the kick coil may be only four or five volts. The increase in voltage is due entirely to what is called the extra current of induction, or what is commonly called "the kick of the coil." On account of having a condenser which absorbs or prevents sparking at the circuit breaker points on the vibrator, the voltage induced will be very much higher than that produced by a make-and-break spark, or "kick coil," where the demagnetization of the iron wire core is slower on account of having an arc or spark through which to let the current pass gradually.

In summing up the action of a spark coil, we are brought face to face with the enormous importance of the condenser and the large part it plays in energizing the coil and producing the spark. Without the action of a condenser it would be impossible to produce a jump spark of sufficient intensity to ignite the charge.

The spark produced by a single interruption, while it looks just like one spark, if split up and analyzed, will be found to consist of several sparks; the first one will be the largest, representing the first surge of the condenser through the primary winding, and each succeeding one smaller. In other words, the oscillation dies out just as would the oscillation of a pendulum.

Spark Coil Builders' Greatest Problem—The greatest problem in spark-coil building is so to proportion the condenser and windings and so build the coil that there will be just as few oscillations of the condenser as possible, thus giving to each oscillation a greater amplitude, causing a larger spark more dynamic in its character and of greater heat value. With an improperly proportioned condenser and improperly insulated windings, the condenser discharge becomes very rapid and consists of a large number of small oscillations, which produces a static spark of no heat value and, consequently, worthless for ignition.

There is one very important feature of the action of a jump spark coil. This is the extra or additional condenser effect that is set up between the primary winding or the coil and its secondary winding, due to the common practice of connecting one end of the secondary winding to the primary winding.

When using a spark coil under these conditions, the more turns of wire on the secondary and the longer the spark gap, the more highly charged becomes this condenser.

The secondary end of the winding connected to the plug forms one plate of the condenser, and the primary winding, together with the engine, and all other parts which are connected to the primary, form the other plate of the condenser.

Now for jumping a small gap or shooting a rich mixture of low compression, when no great electro-static stress or strain is placed upon this self-constituted condenser, but when a coil of this type is used on stationary engine work, where high compressions and thin mixtures of high electrical resistances are met with, it is practically impossible to create a dynamic spark of large heat value, for the energy of the secondary current all goes into charging this unwelcome condenser, and rapid oscillations are set up which renders the spark static and of no heat value.

Improved Insulation Aggravates This—One might think that this condition could be easily overcome by having extra good insulation between the primary and the secondary winding. The fact of the matter is, the better the insulation you use between the two windings, the more aggravated these conditions become, because, as a general rule, that insulation which is the best also has the highest specific inductive capacity. A glass tube or a mica tube would be the very worst insulation to use between the primary and secondary on account of this property of high specific inductive capacity. The best that can be done is to use an insulation of sufficiently high resistance to prevent direct discharges or punctures between the primary and secondary winding, and at the same time have as low a specific inductive capacity as possible.

The only way in which this extraneous and deleterious condenser effect can be practically eliminated is by bringing out both ends of the secondary winding and not grounding either end through the frame of the engine, the primary winding, or anything else; but each end of the secondary winding should run to its own spark plug.

I would suggest for all stationary engines of high compression the use of two spark plugs per cylinder so located in the cylinder of the engine that a circle drawn from each spark plug as a center, the circumferences of these circles touching each other, and also touching the diametrical, opposite sides of the cylinder bore, thus giving each plug a position as nearly central to each half of the compression chamber as possible. This would then give a pure dynamic spark under the adverse conditions of stationary engine ignition from any spark coil of good grade and sufficient size, and would give two instantaneous sparks at widely separated points, which would tend to complete combustion of the charges very much quicker than one spark emanating from one point only.

I wish to state here, and now, that it is absolutely impossible to make a jump spark coil that will shoot compressions of from 135 to 150 pounds with thin mixtures and do it with a dynamic spark where one end of the secondary winding is grounded. I therefore strongly recommend the use of two spark plugs per cylinder and the bringing out of each end of the secondary winding of the coil to these plugs. When used in this way it is easy to construct a jump spark coil that will give a dynamic spark of intense heat and of sufficient voltage to punctuate any compression and to shoot any mixture, no matter how thin or how high its electrical resistance.

It cannot reasonably be expected that a spark coil, which is only strong enough to properly shoot 60 pounds compression, will shoot 160, but larger spark coils should be used on heavy stationary engines. True they cost more money than smaller ones, but they can be made to last as long as the engine lasts, or longer, for if properly made there is nothing about them to deteriorate.

While I have not had an opportunity to test an engine with two spark plugs and with coil as above suggested, still at the same time I would hazard a guess or prediction that this form of jump spark ignition will be found to develop greater power.

INCOMPLETE COMBUSTION IS WASTEFUL

This phase of the subject is sometimes cared for without regard for details, and the magnitude of the saving which follows if the fuel is burned to finality,

(a) Carbon dioxide (CO_2), and (b) water (H_2O).

If some of the fuel is reduced to carbonic oxide, (CO) the loss is enormous, on that account, as the following figures will adequately show:

PRODUCTS OF COMBUSTION FULL AND PARTIALLY LOADED

	Full load	Partial load	Slow free
Carbonic oxide	3.13	6.9	——
Hydrogen	1.19	2.4	——
Hydrocarbons	0.30	0.9	——
Carbon dioxide	11.90	9.9	6.3
Oxygen	.23	0.3	11.2
Nitrogen	83.33	79.6	82.5
Total	100.0	100.0	100.0

Fuel value of carbon burned to carbon monoxide = 4,400 B.T.U.
Fuel value of carbon burned to carbon dioxide = 14,500 B.T.U.
Fuel value of hydrogen gas to water = 62,032 B.T.U.
Fuel value of hydrocarbon fuels to carbon dioxide = 20,000 B.T.U.

If we assume that the total as above given is 100 pounds, and taking the fuel values as above set down for the respective elements and compounds, it will be possible to show that the loss will be enormous if the combustion is incomplete, as, for illustration, 6.9 pounds of carbonic oxide (shown at the top of the column for partial load) would mean a loss of 62,790 British thermal units of heat (B.T.U.). What is more to the point, the 2.4 pounds of hydrogen would mean a loss of 148,877 B.T.U. In the same way, all the losses may be determined.

DETAILS ATTENDING SOLID TIRE USE

In pleasure vehicles, when solid tires are used, it is well to remember that the best performance will follow if the section of the tires is not too great. The diameter of the wheel should be considerably greater than is the practice with pneumatic tires, and the weight of the rim should be restricted; this is easily attained in view of the better performance if the tire section is reduced considerably below that which seems to be good practice in pneumatic tire work. In high wheelers, tires are not made with narrow tread to save cost, as some are prone to believe; the performance of the vehicles is better, due to restricting the "bounce" which would follow were the tires in greater presence.

LETTERS INTERESTING AND INSTRUCTIVE

CAUSE OF ENGINE MISSING

Editor THE AUTOMOBILE:

[1,965]—Can you explain why my four-cylinder four-cycle motor, which runs perfectly when under moderate or heavy load, skips badly when running idle or under light load? This annoyance continues regardless of the speed of the motor or of the adjustment of the carbureter. The carbureter is a Schebler.

J. R. K.

Philadelphia.

Missing is almost invariably caused by the lack of a spark, and since you say nothing about your ignition system or troubles, it is practically impossible for us to give a correct or reasonable diagnosis of the trouble. It would be well for you to look over all wiring very carefully, as it sounds like a case of a wire with the insulation worn through. With the engine running rapidly, and therefore smoothly, this bare spot in the insulation is not disturbed, but as soon as the speed is reduced the vibration begins to be very noticeable. In this latter case, the bare spot in the insulation is moved against some metal part or something which is a good conductor, and a short circuit results. The result is that no spark occurs in the cylinder, and then what happens is that the cylinder passes an explosion, or misses, as it is more usually called. That the above is reasonably close to the real trouble is shown by the statement which you make to the effect that the trouble continues regardless of carbureter adjustment.

ENGINE ABILITY

Editor THE AUTOMOBILE:

[1,966]—On my car there is no control of ignition. That is, the magneto is fixed (which is the way very many cars are being turned out this year in France). Therefore, when the car begins to labor on a hill, the throttle being wide open, even when going very fast, but slowing down, a "knock" develops. The consequence is the throttle has got to be turned off some to stop this.

My chauffeur is anxious that we should get the control of the magneto on the steering-post, which it is possible to do, but we are both in doubt as to whether the engine would develop more power with the throttle wide open and a slightly retarded spark, or a more advanced spark and the throttle half open, as it is now. I am a little doubtful if I have made myself understood, but the following is our course now in going up a long hill:

We have our throttle wide open, the engine slows down a little, a knock develops; we close the throttle an inch or more, the knock ceases. Now, instead of reducing the amount of gas in the engine, if we could retard the spark gradually as the engine slowed down, would we get more power?

AMATEUR.

Toronto, Ont.

If we understand your case correctly, it would not be advisable to make the change from the present fixed spark to a variable spark position. The only difference which this would make is that you would retard the spark very slightly on hills leaving the full throttle opening. As to power, it is doubtful if the engine would develop as much on the average, although the change would allow you peace of mind as far as hill climbing is concerned, which might be worth the sacrifice of some power.

To actually obtain the maximum power, not only a full throttle opening is necessary, but also the largest possible spark advance. Pulling ability on hills, which introduces a number of other variables, should not be confounded with maximum power, the former requiring a retarded spark from the very nature of the work being done, whereas the latter calls for the greatest possible advance.

Since you have asked for our advice, which you would not do unless you wanted it, we would advise against the change, on the ground that you would lose more than you gained, since you climb hills infrequently, but otherwise run the car much.

Another and a different chauffeur probably would want the control simplified as much as possible, while this one seems to want to have it complicated more than it now is. It might be interesting to you to know that the modern tendency is away from the hand control toward automatic.

IN RE SKIDDING

Editor THE AUTOMOBILE:

[1,967]—Regarding No. 1,955 in your last issue, "What to do on wet pavement," I have found it a good thing, when your car commences to slip, particularly when not going very fast, to apply the brake without removing the clutch. If this is done gently but firmly the rear wheels will straighten out quickly and without putting much strain on the engine. When going fast and your car begins to slip, either give "her" more gas or throw out your clutch and put over your wheel so as to throw your steering wheel in the same direction as you are slipping. If you can materially increase your speed your wheels will get a better grip on the road and straighten you out OK.

ALBERT J. MAYER.

New Orleans, La.

The first part of Mr. Mayer's remarks sounds all right, but as to the last part we wish to take exception to the idea of turning the steering wheel in the same direction as the car is skidding. This would simply result, when the front wheels had reached a perfect right angle to the direction of the side slip, in increasing the latter, since the resistance at the pivot point (the front wheels) is thus reduced to a minimum. In other words, it would appear to us as if this mode of procedure would increase rather than decrease the amount of the slip. The advantage of increased speed at a time like this is also very doubtful. When the wheels are already slipping and so have no grip on the road surface, it is hard to see how greater speed will increase the grip on the road. In fact, it would seem as if, granting that the trouble is due to too high speed in the first instance, greater speed later would only result in more skidding and more trouble.

Pulling out the clutch cuts off the power from the wheels, with the result that the car drives itself rather than the engine. This seems to result in the elimination of the objectionable and dangerous side slip.

CLEANING OFF CARBON

Editor THE AUTOMOBILE:

[1,968]—Will you please tell me through "Letters Interesting and Instructive" if the carbon can be burned from the tops of the pistons and from the cylinder walls by pouring coal oil into the auxiliary air valve of the carbureter, while the engine is running?

Rossville, Ind. ROAD EATER.

No. This will not remove the carbon wholly, although it may take off part of it. The kerosene in combination with the jarring action loosens some of it, but as far as burning it off that is impossible, for the carbon is a residue from a burning action. The best way is to use a decarbonizer or else take down the entire motor, scrape it clean, and then paint with a very thin coat of paraffin. It is said that this will aid very materially in preventing the formation of more carbon.

The most important thing about the formation of carbon is to learn that it is caused by incomplete combustion, which also means fuel going to waste. So you should clean the motor and then run it so as to attain the whole use of the fuel, and thereby prevent the formation of future scale to be cleaned out later on. You know the old saying, "An ounce of prevention is worth a pound of cure." It holds good in this case.

ROTARY VALVE ENGINE

Editor THE AUTOMOBILE:

[1,969]—A bit of news that will be of interest to readers of "The Automobile" at this period, when all gas-engine designers are developing gasoline motors for automobile purposes, and especially (judging from interesting editorials in your paper), the subject of rotary valves.

There are a series of tests being made at Atlanta by W. H. and E. F. White, with a rotary-valve engine upon which they have worked in an experimental manner for four years. It looks from the tests as if they have hit the mark, and will be ready to demonstrate inside of thirty days, with a motor having rotary valves in the head, cylinders in block 3 1-4 in. x 5 in., ballbearing crankshaft, water cooled by the hopper arrangement.

This engine, in its operation, does away with valve stems, springs, camshafts, water pumps, piping and radiator. It is understood that it will develop for a long test under load 40 per cent. more power than the formula used to rate gasoline engines.

I understand that the engine will be on exhibition at the show to be held here in the fall. I happened to be one of the few that found out about the construction and tests, and knew that it would be of interest to your many readers to know that Atlanta is to have the first successful rotary valve engine on the market. Another thing: it seems that these young men should be brought to the attention of the manufacturers of automobiles. They have gone about their work very quietly, and one cannot gather any information from them whatsoever, nor do they ever mention it, which I think has been a mistake on their part, as it seems that publicity is what is needed in making an article of this class. I believe that you will do them a great turn if you will mention the fact in "The Automobile."

Atlanta, Ga. B. F. ULMER.

In the statement that the engine develops more power than the rating for this sized engine, Mr. Ulmer doubtless means the A. L. A. M. rating formula. According to this, an engine of the size mentioned would be rated at 16.9 or practically 17

horsepower. To exceed this by 40 per cent. would mean that the motor must develop 23.8 horsepower, which is not beyond the range of the possible.

The statement about rotary valve engines and Atlanta having the first (in case this one is successful) is a little bit overdrawn, since several rotary valve engines have been developed in this country and abroad. For instance, in THE AUTOMOBILE for May 13, was described a new French production, the Anzani engine, which was equipped with rotary valves. This motor is successfully running to-day, as is evidenced by the fact that Bleriot's monoplane, which has just accomplished the passage of the English Channel, is equipped with a three cylinder Anzani engine.

SUGGESTS BETTER ROUTE

Editor THE AUTOMOBILE:

[1,970]—Being an old subscriber to your magazine, and a member of the Executive Committee of the Capital to Capital Highway Association, I would ask that you allow me the privilege of correcting the route given in the July 22 issue of "The Automobile," probably furnished by the press, or the Herald-Journal scout cars, as well as some of the comment thereon. These cars did not follow the true Capital to Capital route south of Columbia, S. C., and thereby encountered much worse roads and a ferry. Both would have been avoided had they followed the route below Columbia, by way of Augusta and Crawford, instead of going via Elberton, Ga. We do not wish that the Capital Highway route be misplaced so early in the proceedings, and, in justice to the roads and our own work relative to the same, do not want to be held responsible for impassable roads and a ferry which do not belong on the proper route. We are not in any way out of sympathy with the Herald-Journal project, for their progress through the country has been of vast importance in the way of stimulating good roads everywhere, and in the neighborhood of routes covered particularly. I am inclosing a correct map of the Capital Highway.

E. M. WHALEY,
Pres. A. C. of Columbia.

Columbia, S. C.

Part of the map, the part dealing with the specific change suggested by Mr. Whaley as an improvement over the one previously given, is herewith reproduced. While an inspection of the new route on a large scale map apparently shows an increase in the distance from Columbia to Atlanta of about 20 miles, this, considering that the total is about 200 miles, and taking into account the elimination of the ferry and the vastly better roads, matters very little.

MORE COMBUSTION CHAMBER

Editor THE AUTOMOBILE:

[1,971]—I have read with interest your answer to my inquiry, published in the July 15 issue, "The Automobile," but your explanation strikes wide of the mark.

After going more carefully through Prof. Watson's article, I find that his figures for an hemispherical combustion chamber are not correct; thus, taking Case C for instance: the volume is given as 233 cc., the area as 205 sq. cm., and the ratio of surface to volume as .88. This volume means a diameter of 9.619 cm. or 96.19 mm., a surface of 145 sq. cm. and a ratio of .665.

The dimensions for my own cylinder reduced to metric measurements would give a ratio of .525.

Referring to the last paragraph of your answer, I wish to say that I have long ere this been convinced that the capacity of a vessel can not very well be changed without altering the wall surface.

But in the case of the cylinder of a gas engine with a hemispherical combustion chamber, your statement is erroneous, as then the ratio of wall surface to volume is a constant, no matter what the compression may be; this is self-evident and does not even require the use of arithmetic.

To close the argument, I suggest that the blame be put on Prof. Watson, who evidently was using a cylinder with a hemispherical top of a diameter less than the cylinder, so that his combustion chamber was composed of two parts: the top, that is, the hemisphere, and the bottom, a section of his cylinder; only he did not say so.

Los Angeles, Cal. A. B. PLAUT.

Prof. Watson may have made a mistake in figuring the wall surface of the theoretical sphere, but in refiguring this, we do not agree with Mr. Plaut either. However, laying that aside, the latter part of the above letter attracts attention in that it is stated that the ratio of surface to volume is a constant. Thus, taking a full half sphere of 88 mm. or 8.8 cm. diameter, the volume is 176 cc. and the area 121.5 sq. cm. These two give a ratio of .69. If to this is added a portion of a cylinder of 80 mm. diameter (in this case the cylinder diameter), 1 inch in height adds 50.2 cc. to the volume and 25.1 sq. cm. to the area, which makes the ratio .648. A similar further addition of another inch makes the ratio .621.

STILZ ENGINE DEFENDED

Editor THE AUTOMOBILE:

[1,972]—Relative to the criticism by Hugo C. Gibson on my constant pressure engine, which was described in your issue of July 8, I would refer to an article appearing in "Engineering News" of April 22, 1909, in which there are developed the calculations involved in this type of engine. The matter there disclosed, will, I believe, refute most, if not all, of the points which he raises against development along such lines.

The statements in the criticism regarding the efficiency and weight per horsepower developed are quite true for the Brayton engine, which is one type of constant pressure engine. Nevertheless, the engine for which calculations are made in the above-mentioned article show a theoretical efficiency of 51 per cent. without the aid of an exhaust gas heater, and 74.5 per cent. with the heater. The actual efficiency from heat developed to delivered brake load will probably be in the vicinity of 50 per cent. (see equations 11, 16 and 17), and, therefore, higher than any heat motor yet produced.

The heat in the exhaust gases is most certainly not lost beyond recovery, for it may be transmitted to the working fluid when this is about to be admitted to the expansion cylinder.

The cooling of the air during compression is indeed lost work, but since the pump is a negative element, this is therefore a negative loss, and hence a gain in efficiency, since, after the work of compression is completed all the heat which was conducted from the air while work was being done upon it is again supplied while it is passing through the exhaust gas heater.

That the rotation of the engine shaft is produced by the differential action of the expansion and compression strokes is true of all combustion engines. That these operations are effected in different cylinders in the constant pressure engine is certainly not to the disadvantage of this type.

It is not difficult to imagine what opinions would be held of an engineer who would advocate replacing the cooling water of an air compressor by a heating fluid, or of one who would advise passing cold water through the steam jackets of a steam engine. And yet such suggestions would be in line with current practice in combustion engines. Of course, when operating an engine at such a very high temperature, it is necessary that the working surfaces of the cylinder and piston be provided with cooling means; but it is not necessary to include with these other surfaces of considerable area within the cylinder, which can readily be protected from such cooling action. Then, it is quite practicable to compress the charge within cylinders which are especially adapted for such purpose, instead of within the working cylinder where it becomes heated at the very time that it should be at the lowest available temperature.

The conditions which surround the working fluid of the ordinary combustion engine are a compromise between two desired opposite extremes, it being quite impossible to even approach the ideal for either operation, where both compression and expansion must take place within the same cylinder.

Then, too, where is the engineer who, from the standpoint of economy, would propose a steam engine having a clearance as large as is found in the standard combustion engine? Still, all of these adverse conditions are essential in the explosive engine, in order to make it operative; so that any further thermodynamical improvement seems impossible unless there is a change in the cycle.

The air-cooled engine described in your issue of July 8, having two cylinders, will deliver as many working strokes per revolution as the ordinary four-cylinder four-cycle engine. It is reasonable to suppose that the two working cylinders can be constructed with about the same weight of material as two cylinders of the other type having a corresponding piston displacement and maximum working pressure. Certainly the two compression cylinders will be much lighter than the two expansion cylinders. Since the expansion and compression are effected under conditions especially adapted to their specific needs, the difference between the positive and the negative work will be a maximum, and therefore the power delivered to the shaft greater for the constant pressure than for the explosive engine. The fact that the clearance in the constant pressure engine is reduced to a minimum assists to this end. Moreover, the working pressure being limited only by the strength of structure comprising the engine, the readiest expedient is available for producing an engine of great compactness and light weight.

It is not understood why the fluid friction should be considered greater in the constant pressure engine. Certainly the passages to the working cylinder need not be of so large an area for air compressed to 500 pounds per square inch as would be required at the pressure of the atmosphere.

The serious error in Mr. Gibson's criticism lies in his desire to embody a few narrow facts about one design of engine into a set of fundamental principles which can be held to apply to any engine designed along somewhat similar lines. I am very glad, however, that these points have been raised, as such actions tend to awaken an interest in a line of effort which bids fair to be a matter of much practical importance in due course of time.

H. B. STILZ.

Bath, Me.

"Capital to Capital" Route as Suggested by E. M. Whaley

New Four-Cylinder Reo Has Graceful Body Lines, Long Wheelbase, and Large Wheels

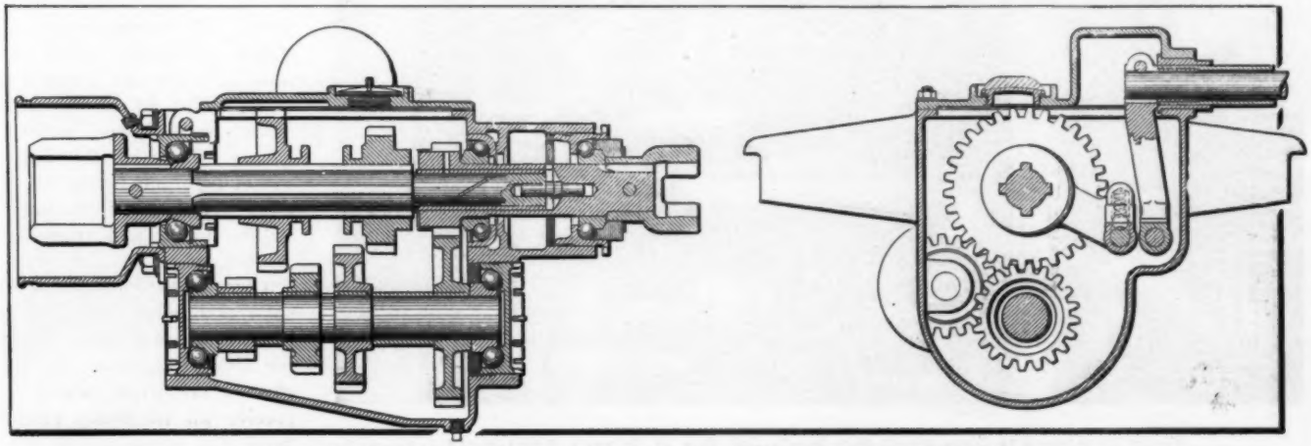
AS the foremost exponent of what foreign automobile constructors have been pleased to term the American type of machine, namely, the automobile with a single cylinder or a pair of cylinders placed horizontally under the body, R. E. Olds is known the world over. The public, always fickle, however, demands new forms of construction, and to meet these demands Mr. Olds, now at the head of the company which bears as a name his initials, the Reo Motor Car Company, Lansing, Mich., has brought out an excellent example of a modern four-cylinder, five-passenger, medium-powered motor car.

This new and most popular type of machine will be known to the trade as Model R, and is rated at 30-35 horsepower. The principal body form will be the five-passenger touring car, shown in finished form in the heading above. This car, being made to meet a popular demand, will be sold at a popular price, the figure set for this being $1,250, with top $75 extra.

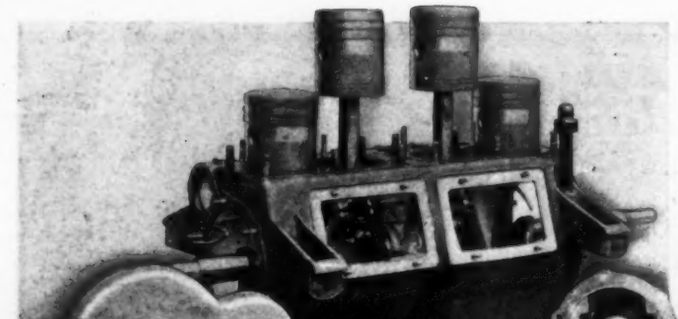
While combining the very best foreign and domestic practice, the new car will be strictly American in general design and construction, even going so far as to have the control concentrated on the left side, a practice that is gradually coming into extended use. Aside from this feature, the whole car follows standard lines as laid down by America's best designers. Thus, the body is of the modern straight line type, with approved fender shapes. The tonneau is close to the so-called baby tonneaus and yet partakes of a large and generous size, so that the occupants will not be crowded. This clever combination results in a fast, racy-looking car with very comfortable riding qualities, yet not extreme in any particular.

Large tires, coupled with adequate springing and a long wheel base make for easy riding, without which the best of other parts would be useless, and the finest design, together with first-class workmanship and material, would be wasted. The first-named, workmanship, is well cared for in the very large and modern shops at Lansing. These rank among the foremost in the country, and much time and thought is brought into play to keep them in that position at all times.

What the New Power Plant Shows—Four vertical cylinders cast in pairs characterize the motor, the dimensions of which are 4-inch bore and 4½-inch stroke. This gives a ratio of bore to stroke of 1 to 1.125, showing again the most modern tendency toward a relatively long stroke. The cylinder pair castings are of a special grade of close-grained gray iron. A one-piece crankcase is used as reducing the cost of manufacture, as being a more rigid construction, and as being more advantageous to handle, both at the factory and by the owner. This form contributes much toward the furtherance of an efficient lubricating system. The latter is of the pump circulative type, in which a large plunger pump, driven from the camshaft through an eccentric, delivers oil from the reservoir in the bottom of the case and forming part of it, to the three main bearings and to the gears. The bottom of the case is divided into a series of compartments, into which the oil drips from the bearings. These pools of lubri-



Three-Speed Selective Transmission Is Small and Compact Yet Business-like



One-Piece Crankcase Unit Shows Up Well

cant then form the basis of a splash system, which takes care of the whole interior of the engine.

Lest this method prove too generous and flood the whole inside with oil, splash plates are provided which effectually prevent more than the necessary amount from rising up into the cylinders. In this arrangement of the motor oiling, there are no outside pipes to leak or otherwise give trouble, no stuffing boxes to be periodically replaced, and no adjustments to make. With a screen to clean the oil and protect the pump, and a small three-quart reservoir to be kept filled, it seems as if the important problem of lubrication is reduced to its simplest terms. Aside from the one-piece crankcase being perfectly tight, much care is exercised to have all other joints oil tight, resulting in a clean and neat power plant at all times.

High-Grade Material Freely Used—Special manganese steel is used for the crankshaft, this material being famous for its strength, rigidity and other qualities so necessary in the crankshaft. This particular steel has a tensile strength of 110,000 pounds per square inch with other qualities in proportion. The use of paired cylinder castings allows the use of a central bearing, which brings the number of crankshaft bearings up to three. These are 1½-inch in diameter, with an aggregate length of 10½ inches. This total length is one of the most important details of engine design, since insufficient length means short life and consequent expense. The crank pins are also 1½ inch in size by 2¼ inch long. Offsetting is resorted to in both the crank and camshaft, to avoid excessive side thrust, which soon wears out the parts and necessitates renewal.

Both the main bearings and the connecting-rod bearings may be inspected or taken up very readily through the two large handhole plates provided on each side of the crankcase. This provision for adjustment from the outside is a very important one, since otherwise it would be a source of much trouble and endless work to take down the whole lower part of the engine to perform a simple act of adjustment.

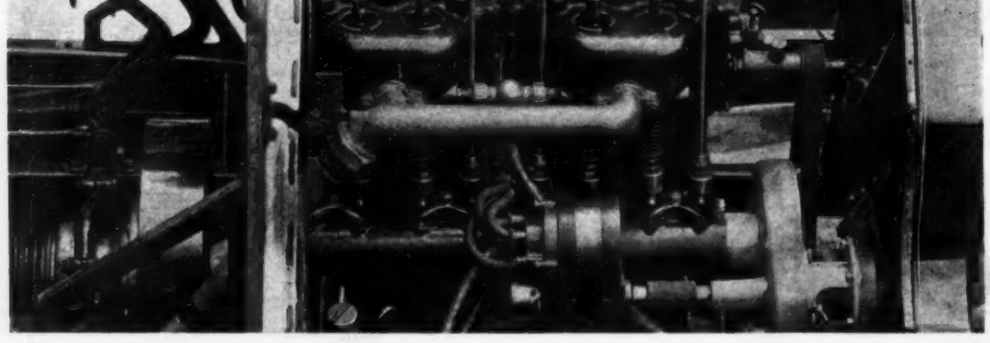
In a machine which possesses many unusual features, it is a hard matter to select a few for special mention, but a feature that at once attracts about the engine is the location and size of the valves. These are so placed as to allow of their being unusually large, the advantages of which are too well known to require additional mention here. The exhaust valve is placed on the right-hand side in a pocket, while the inlets are located in the head, in a removable cage which facilitates regrinding. The separated positions of the two allow of both being very large, which is seldom the case, despite its advantages. All valve lifters are adjustable, and faced with fibre to decrease the noise of operation to a minimum.

Valves of Large Diameter and Bevel Seated—All valves are bevel-seated and composed of 35-point nickel-steel heads electrically welded to cold rolled-steel stems. The silent feature is furthered by using, for the operation of the camshaft, spirally-cut gears. The shaft runs on three long bronze bearings, and is itself of a very large diameter.

Connecting rods are of a heavy I-beam section with two bolts. The latter are fitted with an ingenious locking device. A square-headed screw is used, fitting tightly in the upper part of the rod end and screwing into the lower end. Its length is so proportioned as to allow of its projecting through about an inch. Upon this extension is set a clamp, which is bound together or clamped by a small buttonhead screw. The latter is also very long and projects through the clamp so as to set against the body of the rod. By placing this clamping screw on the proper side of the holding bolt, so that in unscrewing, the bolt would bring the small set screw to bear against the rod, this unscrewing action is effectually prevented.

In the clutch another modern tendency is discernable. This is of the multiple disc type, with alternate discs of hardened steel and phosphor bronze.

Clutch Discs Are Hardened and Ground—The steel discs are ground after hardening to secure a perfectly flat surface. A large ball thrust takes up the spring pressure, the spring being a single, easily adjusted unit. When the clutch is out of engagement, there is no end thrust. The size and number of the plates composing the clutch are such as to secure a very large surface of contact, this allowing of simpler lubrication, smaller spring pressure, easier engagement and disengagement. The clutch connection to the transmission is through a double universal joint of liberal proportions, encased and packed in grease. It is of the full universal type and by its use complete freedom of motion, between engine and transmission is obtained.



Wood Dashboard Is Clear of All But Spark Coil Box at Driver's Right Hand

Three speeds are afforded by the transmission, which operates on the selective plan, a swinging lever located on the inside close to the driver, where it can receive all necessary attention, being the prime mover for all

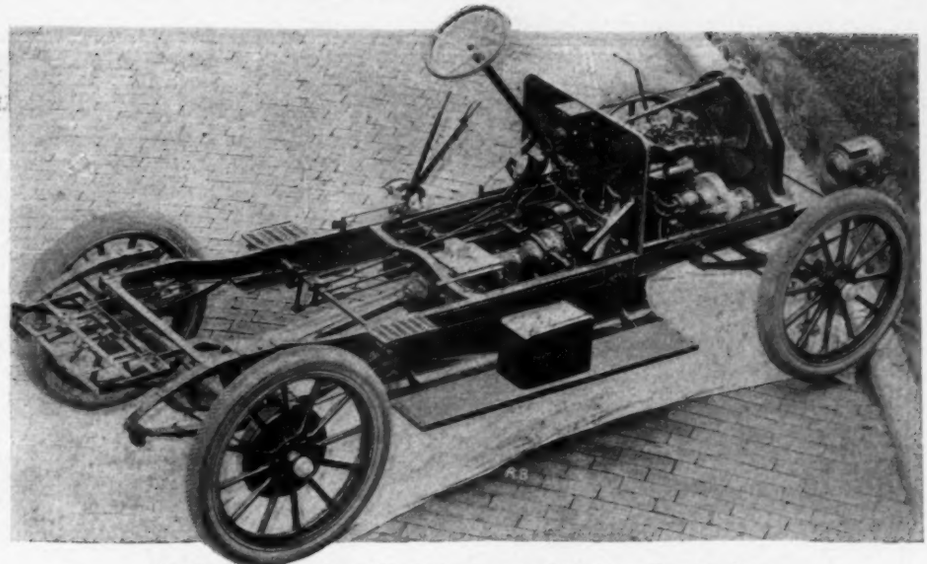
gears. Gears are of a special gear steel, cut to six pitch with ⅞-inch face, hardened, and ground after hardening. So, too, with the shafts, which are hardened and ground. The gears slide on four keys formed integral with the upper shaft, the lay or jack shaft being placed below the main shaft, but in the same vertical line. The case is a single casting with removable ball bearings and a single large removable top cover. The latter has an oiling aperture in the center, which allows of lubrication without removal. Shifting rods are enclosed, which with the one-piece case should eliminate the usual gear-case oil leaks.

Both axles are conventional in so far as the general design is concerned, the front being of an I section, one-piece drop forging, and the rear, semi-floating. At the rear axle, the bevel gears are mounted on adjustable ball bearings and the outer ends of the shafts, on roller bearings. The front axle is of manganese steel, carefully heat treated, with the spring saddles forged integral. All front-axle bearings are of bronze, with hardened steel pins rotating within them. For protection's sake, the cross connection is carried at the rear of the axle.

A sixteen-inch steering wheel gives the driver command over the direction of the car through the medium of a gear of the bevel type. In this, a large diameter bevel pinion acts upon the hardened steel pinion. A single adjustment is easily accessible. The steering wheel has an aluminum spider, upon which are mounted the hard rubber rim pieces.

Ample clearance is provided at the low points of the chassis, that under the front axle being 12 inches. At the rear axle, the lowest part of which is the differential housing, this is increased to 12½ inches. This case is made with a large and easily removed cover, through the medium of which the driving gears may be adjusted. After removing this cover, the adjustment is simple, a pair of adjustment rings being provided, which are set into the desired position and locked. The torsion tube, which encloses the driving shaft, runs on ball bearings, these being readily adjustable from the outside.

The upper end of the torsion tube is formed by a large diameter spherical ball joint, which is hung on the rear shaft of the transmission. This, forming a universal connection at an important point, is also enclosed in grease, so as to require no outside lubrication at any time. A leather boot covers the whole joint and is protection against the loss of any grease, which would be both objectionable and dangerous.

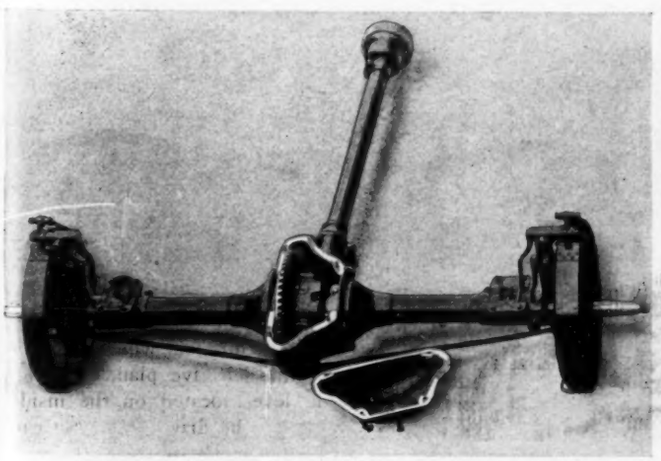


As New Reo Looks with Body Removed to Show Construction

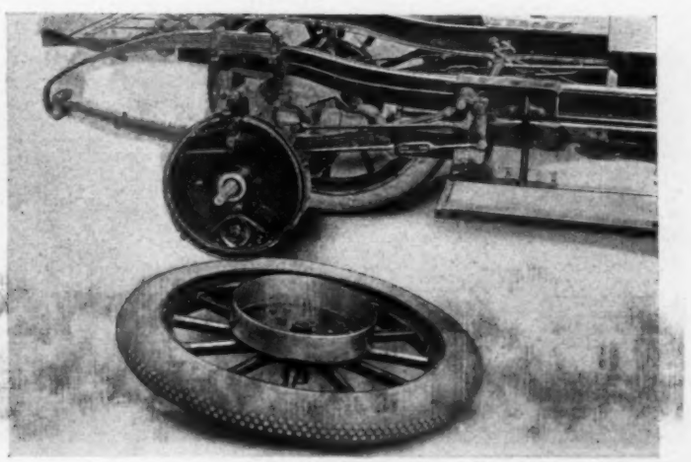
Large Wheels and Long Wheelbase Make Riding Easy— Since nothing is more desirable than easy and comfortable riding qualities, these are sought after in the use of large wheels, 34 inches in diameter, equipped with 3½-inch Michelin quick-detachable tires. So, too, the length of the car contributes much, the wheel base of 108 inches being of great service. The front axle is located on a line with the radiator, while the frame at the back overhangs the rear axle by 8 inches. This frame is of pressed steel, hot riveted and well braced. A sub-frame carries the engine and transmission, while sheet-steel sides close in the space between sub-frame and side-frame members. The frame is upswept at the rear to obtain easy riding and a low center of gravity. The sub-frame is set as a slight angle so as to help the straight line action between engine and rear axle. Springs are always an important item in the matter of easy riding qualities, and this has been covered by the use of semi-elliptic fronts and three-quarter elliptic rears, all two inches wide.

Ignition is by magneto as the principal dependance, but storage batteries are provided as an auxiliary. The magneto is attached by a single strap, so that the turning of a wing nut loosens it for removal. A universal joint in the driving shaft permits of disalignment without serious trouble.

Control is on the left side and consists of a pair of side levers, the swinging transmission lever and another for the emergency brakes. The latter is the outer lever and is interlocked with the clutch. Of the two foot pedals, the right controls the band brakes on the outside of the rear-brake drums, and the left, the clutch. A muffler cut-out pedal is also provided. Spark and throttle levers are on the steering post, but below the wheel.



Semi-Floating Rear Axle and Differential Case



Both Sets of Brakes Operate on the Same 14-Inch Drum

Viewed from the Side, Christie's Seventh Car, a Racer, Looks Very Fast and Business-Like

AS an ardent and altogether consistent advocate of front driving, from the construction of his first car in 1904 right up to date, Walter Christie is well known. His long and costly apprenticeship has culminated in the present example of a chassis, designed to take either four cylinders 5½-in. bore x 7-in. stroke with a touring car body, or four cylinders 7½-in. bore x 7-in. stroke when equipped as here shown for a racing car.

Christie has built, in all, seven different cars, all front wheel drive, all wheel bases between 100 and 106 inches, wheels 30, 32, or 34 inches, all direct on high speed and all fitted with a low forward speed and reverse, two speeds only, as follows: His first car, January, 1904, had four cylinders, 5 x 6 in., with automatic intake valves. This was fitted with a 5-passenger touring car body, and weighed about 1800 pounds. The crankshaft was placed cross-wise of the chassis, in line of the front wheels, which were driven by universal shafts from the crankshaft end direct on high speed, had a clutch and 5 to 1 reduction, low speed and reverse. With its 5-passenger touring body this car had a record of a mile in 55 seconds, straightaway.

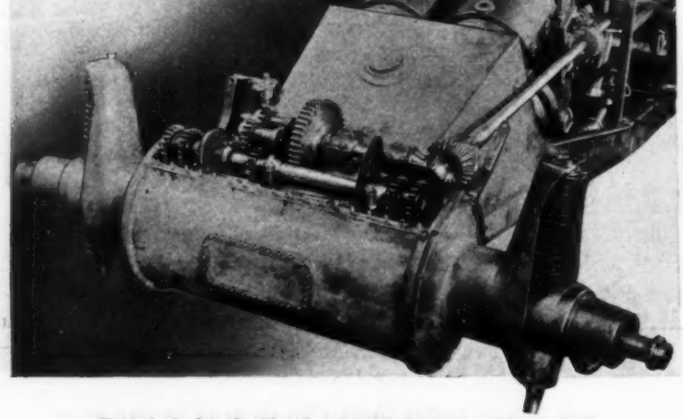
Front driving characterized the second car, January, 1905, which had the same general arrangement with four cylinders 6¼ bore x 7-in. stroke, racing body, weight 2100 pounds. At the Ormond Beach meeting, January, 1905, this car made a straightaway mile in 40 seconds, and was the only American car to finish in the International race of 100 miles, back and forth on a 16-mile stretch of beach. Christie's third was placed on the road in April, 1906; had the same front drive with four cylinders 7⅛ x 7 inches. This, like previous engines, showed a preference for short stroke.

Made a Speed of 113 Miles Per Hour—The weight was 2150 pounds. This car made a recorded mile in 35 seconds, at Atlantic City, April, 1906. This same car made 1906 mile records on circular tracks: 53 seconds at the Empire, 52 seconds at Readville, and 52 seconds at Minneapolis, which are yet the American circular track records.

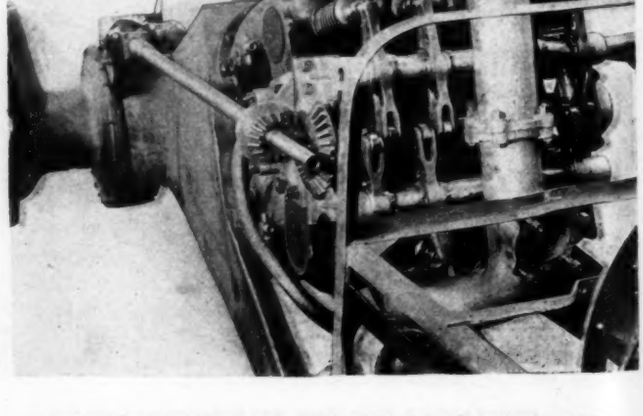
In this same year, Christie built a small touring car with four cylinders 5¼ x 7 in., automatic intake valves, 60 pounds compression and fitted with a 7-passenger touring body. Weight 2300 pounds with touring body and 1900 pounds with racing seats.

This Christie racer was entered for the 1906 Vanderbilt race, but broke a steering arm at East Williston, L. I., before the race, ran into a telegraph pole, was wrecked, and was never rebuilt. Christie ran the race with his little 1906 car and nearly finished the ninth lap of the Vanderbilt course at the time the winner finished his 10th lap. This small 1906 car was subsequently purchased by W. Gould Brokaw and taken to France, where it made 290 miles on 10 gallons of gasoline, 29 miles to the gallon, two passengers up.

His fifth car was a new chassis built to take the 1906 motor placed on the road in July, 1907, and entered for the French Grand Prix race of that year. The car was forced to withdraw



Transmission Is Simple and Placed Over Front Axle

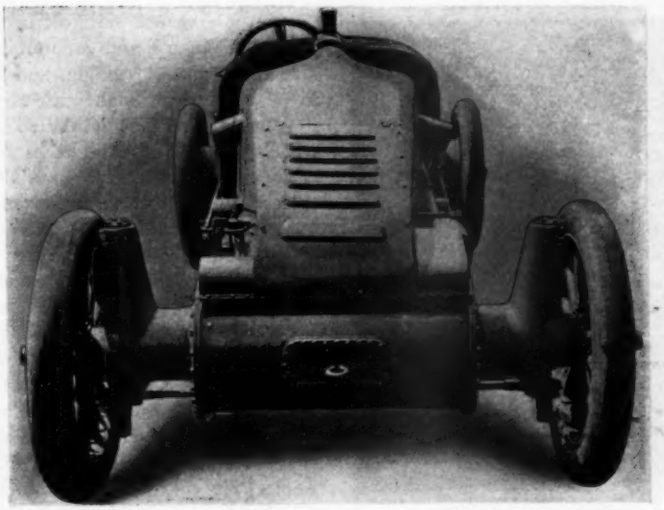


Overhead Valves Are Used and Very Large Carbureter Pipe

with a broken valve stem at the end of 235 miles. This car did a mile at Ormond Beach, March, 1908, in 33 seconds, not officially timed.

Sixth on the list was the front drive cab, placed on the road June 1, 1908. The motor is four cylinders, 3¼ x 5 in., 60 pounds compression, all valves mechanically operated.

Seventh and Last Car a High Power Racer—Lucky seven is the number held by the car here shown, which was placed on the road July 8, 1909. This car is fitted with three sets of wheels, 30-inch for circular tracks, 32-inch for road work, and 34-inch for straightaway road or track racing.



Long Front Slope Which Eliminates Wind Resistance

This is a long record of experimental cars, all of which were fast, economical of fuel, and showed the advantages of front drive.

Undoubtedly Christie erred in his choice of automatic intake valves, abandoned in favor of mechanical operation in the last two models, the cab and 1909 racer.

Herewith is shown the car which was built to show the advantages of the front drive under all conditions, and is fitted to take not only the three sets of wheels, but two different motors. One, here shown, for racing, four cylinders, 7½ x 7 in., and one for touring, four cylinders, either 5½ x 7 or 6 x 7 in., so, with this one chassis all conditions can be met to give needful comparisons with rear driven cars.

In car number five, the cylinders were inclined somewhat to the rear, to obtain a better distribution of weight, and in this seventh model, the cylinders are very much inclined. The connecting rods are made extremely long, 30½ inches, to carry the cylinders far enough to the rear to equalize the front and rear tire loads. This car in racing form is expected to make the straightaway mile in 30 seconds, and the novelty of form and arrangement lend great interest to its future.

Details of the Present Car, Inclined Cylinders Noticeable—The front wheel drive, direct from crankshaft to front wheels, gives the latter a heavy load to start with, if the cylinders are vertical. This load would be increased by placing the radiator in its usual position. This 1909 racer is designed to place about the same load on each axle. For a touring car with this same general chassis arrangement the radiator will be much lower and the front-board, placed close to the cylinder heads, will stand in about the usual location on the chassis.

Greatly varied from the ordinary form is the front construction by carrying the frame up to take the motor-base. This is finished to two angles to take the two banks of cylinders. The motor-base is flanged all around, 3 inches in depth, and the side flanges are riveted to the frame extension. An inclined cover extends forward and is riveted to a full length bracket, integral with the cylindrical bronze crank box. This is opened on top to take the low speed and reversing gears, while a flat part of the crank box top is planed to take the slow speed shaft bearings. The camshaft is driven from the first shaft through two pairs of bevels.

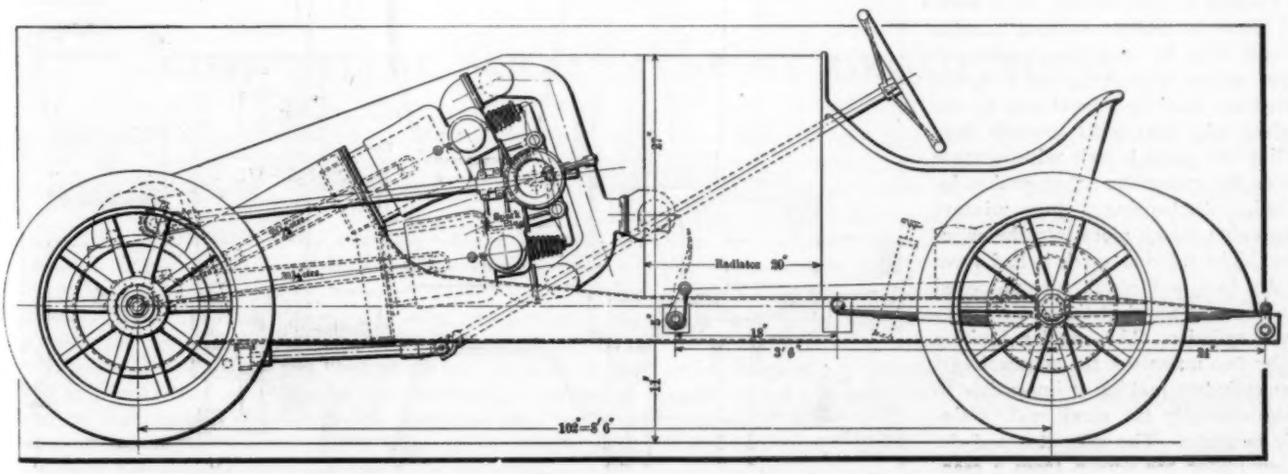
Unusual Size and Shape of Radiator—The radiator is very large, open-arched in form, 29¾ inches high by 35 inches crosswise and 32½ inches lengthwise. It is made up of 80 tubes in two arches, 40 tubes in each arch, total thickness 2 5-8 inches.

Like the radiator, the motor is an unusual form; the crankshaft has two throws only, and the cylinders are single units placed in upper and lower pairs, the center line of the latter at an angle of 8 deg. and that of the former 28 deg., to the horizon, making the angle between the pairs 20 deg. The two lower connecting rods go directly to the cranks and are 30 1-2 inches center to center. The upper connecting rods are 23 1-2 inches, center to center, and do not go to the crank pins, but are jointed to the lower rods at 7 inches radius from crank pin center.

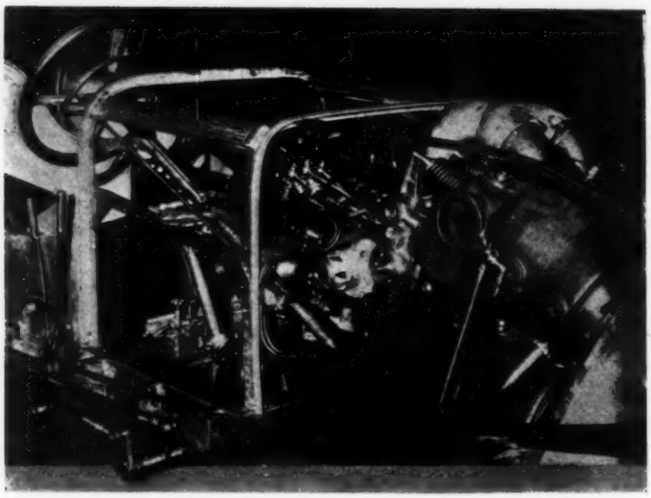
This angular separation of the two pairs of cylinders permits placing the camshaft in the rear of, above, and between the cylinders, with integral cams.

The front wheels have steel hubs and inserted tubular spokes. The rear wheels have integral steel casting brake-drums and spokes, to which the tire-rim is applied.

How the Transmission Works—The crankshaft is normally free, and at each end carries the driving members of a disc clutch which can be clutched to the inner ends of the universal shaft sleeves. To obtain low speed and reverse, the intermediate crank-arm is given the form of a toothed gear, 11 inches pitch diameter, which engages a pinion 8 inches pitch diameter, fitted with a multiple disc clutch. The integral pinion shaft has fixed to its left end the first bevel pinion of the camshaft gear train, which is thus driven when the crankshaft runs. The right-hand pinion drives a third pinion through an intermediate second pinion



Line Drawing of Complete Car with Dimensions, Showing Size and Location of Driver's Seat



Accessories Are Conveniently Located Inside Radiator Arch

to obtain reverse; it also engages a transfer pinion, and between the reverse pinion and the transfer pinion, there is placed a gear fixed to a sliding shaft.

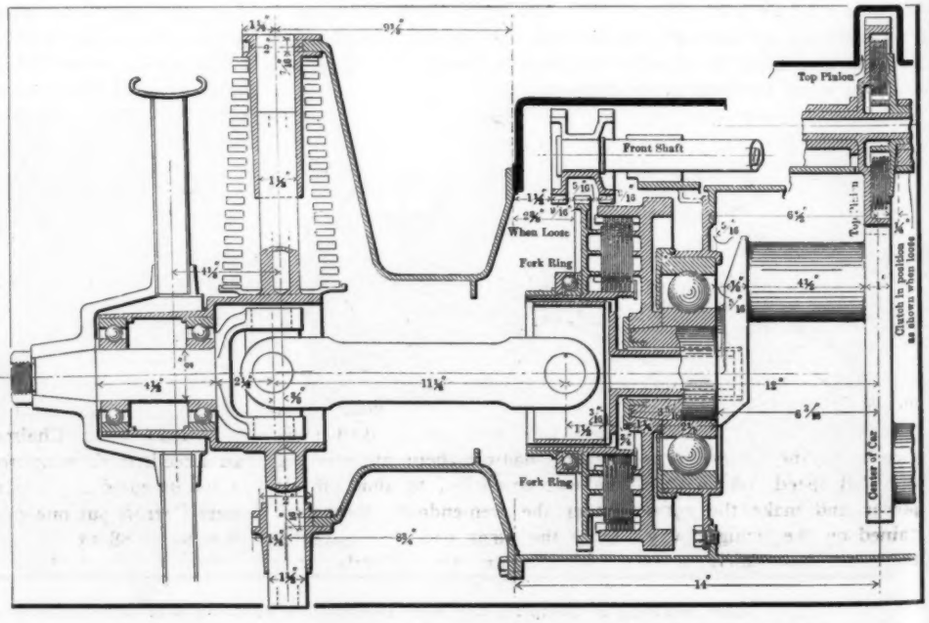
Operation of this drive is as follows: With all clutches disengaged, crankshaft driving the camshaft gears and camshaft only, the motor is started by giving a double stroke to the hand operated gang of four charging pumps. Then, with the motor working, the top pinion clutch is engaged, starting the reverse and forward slow-speed pinions; according to direction desired, the front shaft is made to slide to the right for backing or to the left for slow forward. Front shaft pinions slide into engagement with universal-sleeve gears, and so start the front wheels. The front shaft is made to slide endwise by rocking a vertical forkshaft interlinked with the direct drive clutch fork, so that when the direct fork is moved the front shaft slides the low speed pinion out of engagement before the direct drive clutch is operatively engaged. Reverse is not interlinked with direct clutch.

Differential Is Eliminated—This form of front drive does not include a "differential." Two pairs of pinions, one pair on each end of the front shaft, have considerable "lost motion," so that the outer wheel can overrun the front shaft in turning corners. The regular touring car drive will include a bevel balance gear on the front shaft. For turning very short corners with the direct drive, the clutch pressure is partially removed by foot pressure. For rounding large radius curves, the drive takes care of itself. This method of gaining the advantages of the differential without its inherent complications is more than praiseworthy.

Christie's "self-starter" is a bank of four carbureter-sucking pumps, 1 3-8 bore by 8 inches stroke, all four piston rods being fixed in one cross-bar used as a hand-grip by the driver who first pulls towards him, filling the pump barrels with mixture from the carbureter; then pushes inward, discharging the mixture through 1-8-inch pipes into the cylinder. The starting spark is had from a dry battery through a hand-moved commutator which delivers a spark to each cylinder. The regular ignition is by two magnetos, the angularity of the cylinders making it impossible to time correctly the spark with a single magneto. The magnetos and the commutator are driven from a rearward extension of the inclined bevel gearshaft, the magnetos, by spur gears, and the commutator, by a bevel gear. The hand-starting pumps, magnetos and commutator are all placed on supports inside the radiator framing, and are covered by the radiator when in position. This makes all accessories handy to the driver.

Wheels Are Special With Steel Tube Spokes—The front wheels for this car are 30, 32 and 34 inches tire diameter; three entire sets of wheels. Spokes are steel tubes, 1 5-16 diameter outside, walls 3-32 thick, inside ends forced into seats in the steel hub. The outside over-all diameter of the spoke sockets is 8 1-2 inches and the inside diameter of the spoke socket circle is 6 inches. The spokes abut against shoulders in the sockets. The hub is deeply cupped to go over the ball-bearings, the cup being 4 5-8 inches total depth, 3 inches from the center of the sockets to the inside of the hub-flange, which is 9-16 thick in the vertical member and 3-8 thick in the cup-wall. The outer end of the hub is keyed on the stub-axle taper and held up with a hex nut. The hub taper seat which takes the stub-axle is 2 1-2 inches long, outside diameter, 1 7-16, inside diameter, 2 inches. The universal joints have yoke eyes 13-16 thick, 5 inches over all, 3 3-8 opening to take the cross-body, 2 1-8 diameter, which is shouldered down to 1 1-2 inches diameter for the cross trunnions. The universal shafts are 2 1-4 inches diameter, steel, solid, and have forks 2 3-4 inches wide x 13-16 greatest thickness. The universal forks are turned to globular form outside. The joint trunnions are hardened steel bushes, forced in, and have 7-8 holes through them, these holes being threaded at the outer ends to take threaded heads, 1-4 thick. This construction leaves a large chamber in the cross-hub which is packed with heavy grease. Shallow cuts are made in the trunnions to deliver grease to the inside ends of the bearings in the yoke eyes, this grease working outward by centrifugal action. The universally jointed stub-axles are in two circles of 11-16 diameter balls, ball circles about 3 3-16 diameter and 3 3-8 between circles.

Details and Dimensions of Axle Sleeves—These are 5 7-8 outside diameter at inside ends, 4 3-8 long, bored 5 3-8 to take the universal joints inside; this inside part has integral trunnions, vertical when placed in the front axle shell, trunnions each 1 1-2 inside diameter, upper trunnion 10 1-16 and lower trunnion 9 1-16 inches, trunnion end to sleeve center. These trunnions, on which the front wheels swing in steering, are bored 5-8 diameter for the top one and 3-4 diameter for the bottom one from the outer ends to the hub sleeve. These slide in a bronze bushing below and a nickel steel bushing above, these bushes being provided with double flanges which take the axle yoke flanges in the grooves, where they are secured with five screws 7-16



Construction Drawing of Front Drive and Section Through Transmission

diameter. The outer member of the axle sleeve is 4 3-4 outside diameter and 4 3-8 inside diameter, flanged to stop the ball cups, as before described.

This axle sleeve has about 5 1-2 inches clear vertical travel by the sliding of its integral trunnions up and down.

Front springs are volute (spiral), rectangular in section, 11-16 x 1-4, 4 1-2 inside, outside diameter at bottom and 3 1-4 outside diameter at top end, 18 turns, 17 spaces 1-4 inch wide, giving 4 1-4 inches spring closure. This spring closes under 800 pounds load and carries about 600 pounds when standing still on the road. The lower end of the spring rests on a flanged steel washer, 4 3-4 inches outside diameter.

Because of greater length, owing to the spring placing, the top trunnion is made the heavier, and is supported in a nickel steel sleeve, while the shorter and lighter lower trunnion is supported in a bronze sleeve.

The steering arms are nickel steel forgings, oval section at the root, about 1 1-2 x 1 1-8, applied to the large part of the axle sleeves and retained with 11 rivets, each 5-16 diameter. The steering arm eyes, 1 1-4 diameter by 9-16 thick, with 5-8 diameter pin-holes, are about 12 1-2 inches radius.

Another Strong Supporter of the Disc Clutch—In the Christie front drive there are three separate disc clutches, one in the top pinion, and one at each end of the crankshaft. The discs are all spring tempered, saw steel, ground flat. The top pinion clutch has 10 discs, 6 1-8 inches effective outside diameter. The direct drive clutches are each 18 discs, 11 3-8 effective outside diameter x 7 3-16 inches effective inside diameter. The top pinion clutch is normally disengaged, has no spring, and is engaged by pushing the engagement-disc capped-and-pointed-sleeve-end into engagement with the short arm of the engaging bell-crank, the points of contact being hardened. The crankshaft clutches are normally engaged by spring pressure applied to the clutch linkage; the engaging fork ends, hardened, bear against a hardened ball thrust bearing ring. The fork hand lever is in a quadrant and is latched to hold the clutch out.

All principal members are carried on ball-bearings, Hess-Bright, including the crankshaft, camshaft, and bevel gear shaft. The front and rear wheels are on ball-bearings; the crankshaft bearings are very large, 8 7-8 inches outside diameter, balls 1 5-8 inches diameter.

Front axle is a cylindrical bronze casting, 15 1-8 inches diameter, 3-16 wall thickness, flanged at each end to take bronze heads, which are cast integral with the spring forks. The diameter of the spring forks member is 7 1-2 inches, walls 3-16 thick.

The rear axle is a steel tube, 2 1-4 diameter, with 1-4-inch walls, the axles 1 3-4 diameter, entering the tubular body, retained by shrinking and pinning.

Naturally, the Springs Are Decidedly Different—The rear springs are semi-elliptic, 48 x 2 inches, 5 leaves, top 3 leaves banded together, front eye jointed to frame, rear eye linked to frame by links in tension, spring passing under axle. The rear axle travels up and down in slots in the manganese bronze castings which form intermediate members of the frame sides. The frame sides are of sheet steel 1-8 thick, 5 inches greatest depth in rear of motor x 1 1-2 inches wide. The greatest side-frame depth occurs at the top corner of the motor base, and is 21 3-4 inches. There are two widths to the frame, 30 inches rear to front of radiator, then drawn in on a straight taper to 18 1-2 inches width where the frame front end joins the cylindrical box which forms the body of the front axle.

Save for unusual connecting rod length, the motor is of ordinary water cooled construction, cylinder bore 7 1-2 inches, all valve ports 3 inches in diameter, all valves mechanically operated and all located in the cylinder heads. The piston packing is four snap rings, all above the piston pin. The camshaft is midway between the cylinder heads, and the valve action is by beams turning on hollow shafts.

Water circulation is by a two-pinion water pump, chain driven from the rearward prolongation of the side shaft.

The crankshaft is a steel forging, 19 inches over all, having two crank-throws, 3 1-2 inches radius, cranks set at 180 degrees. The crankshaft has journals 3 1-2 inches diameter at each end, in Hess-Bright ball-bearings about 8 13-16 diameter, 1 3-8 diameter balls. The crank-arms are each 7-8 thick. What would be the middle crank-arm is a gear, 1 inch face, 11 inches pitch diameter, which engages the 8-inch pitch diameter pinion to drive the top shaft. The crank-wrists are 3 inches diameter x 4 1-2 inches long. The connecting rod wrist bearings are offset on the rod. The ends of the crankshaft are tapered and fitted with nuts to force the friction disc clutch cup onto the taper, which is about 5 degrees.

The brakes are internal, only, in the rear wheel hub-drums, are 14 inches diameter x 3 1-2 inches face, and are fiber-faced expanding bands, one end of the band fixed and the other end jointed to the short arm of the brake rock shaft.

Carbureter an Original Design with One Standpipe—The carbureter is Christie's own construction, a float feed with a single standpipe, an automatic air intake and a mechanically operated air admission which is linked to the throttle, so as to decrease air supply as the volume of cylinder charge is diminished. The carbureter supply pipe is of very large diameter.

Steering action is by a pinion and rack, hand wheel 18 inches in diameter, steering shaft pinion 2 1-2 inches pitch diameter, one turn of the hand-wheel to full sweep of the front wheels. The spark control is forward of the hand wheel and stands upright for ordinary position. The throttle control is at right side and forward of the hand wheel. There are three pedals on the footboard, one for the brake and two friction clutch pedals. There is a small lever latched in its quadrant, at the driver's right, which disengages the normally spring engaged, high-speed clutches, these being of the multiple disc type.

CHRISTIE THE BRIGHT STAR AT GROSSE POINTE

DETROIT, MICH., Aug. 2—When, during the first day of the "national circuit" automobile races at Grosse Pointe track last Friday, Walter Christie in his 100-horsepower space-eater negotiated a mile in 57 seconds, a new mark was set for the local track. Saturday Christie not only repeated, but clipped nearly three seconds off his former achievement, making the mile in 54 3-5 seconds. Christie's course was surrounded by difficulties. The track was not banked sufficiently at the turns to permit his making them at anything like full speed. As a result he was compelled to shut off his power and make the curves under the tremendous momentum gained on the straightaway. Once the turns had been covered, the gray racer fairly flew through the air, the half-mile mark in one trial being passed at a speed of over 100 miles an hour. Christie is confident that on a straightaway like that at Ormond Beach he can do a mile in 28 seconds with this car, and those who witnessed its performance believe he can.

Christie had as rivals Barney Oldfield, S. K. Crocker, Joe Matson in the Chalmers-Detroit "Blue Bird" (with which he won the Indiana Trophy over the Crown Point course), Billy Knipper, Gelnaw and others, but his record was never in danger, although good time was made in the various events.

Matson, in a Chalmers-Detroit, did five miles in 5:48 4-5, an excellent showing for a 30-horsepower car, and twenty-five miles in 29:36 2-5. In the fifty-mile event, Knipper in a Chalmers-Detroit put one over on Matson, his teammate, making the distance in 58:13.

"Mistah Jack" Johnson, colored pugilist, who modestly announces his desire to become a professional auto racer, drove out to the track, and divided attention honors with the speed stars.

Wrights succeed in Government Tests

Start of the Official Trial for Speed at Fort Myer, in Which Orville Wright Made a World's Record of 42.6 Miles Per Hour

WASHINGTON, D. C., July 30—This evening Orville Wright successfully made the second of the two official test flights, a ten-mile cross-country trip, and his aeroplane has been accepted by the Government. The average speed was 42.6 miles an hour, and as the contract price was $25,000, with a bonus of $2,500 for each mile over 40 miles an hour, the Wright brothers receive the snug total of $30,000. Incidentally, the flight may well be called a world's record, as never before has an aeroplane flown over such rough country, and that, too, with a passenger on board.

The course was a five-mile air-line to Shuter's Hill, near Alexandria, Va., and return to Ft. Myer. The turn and the halfway point were marked by captive balloons. The original time limit to the flights expired last Wednesday at midnight, and the Wrights attempted to complete them on time. Wednesday, however, was a day of disappointments. A high wind in the morning wrenched loose the balloons marking the course, and one of them was lost. At 7 o'clock the machine was brought out, but the motor refused to work and much time was lost before it was finally discovered that the gasoline feed pipe was clogged up. By the time it was in running order again it was too dark to fly, and the crowd went home disappointed.

Wilbur Wright then conferred with Secretary of War Dickinson and obtained a three-day extension of time. Thursday a severe rainstorm prevented any flights. The brothers wanted to make a trial in the early morning the next day, but as the army officers, who were to act as observers at Shuter's Hill, would have difficulty in reaching their posts on time, it was agreed not to attempt this unless to-day, too, was unpropitious.

The day opened with a series of thunder showers, and it was not until the middle of the afternoon that it seemed possible to hold the trials. About four o'clock the clouds began to break up, and at six the aeroplane was brought out and set on its starting rail. Some time later Wilbur and Orville appeared, accompanied by Mrs. Wright and Miss Katherine and a party of friends. After a conference with the judges, Wilbur dragged a big rock out into the middle of the field and laid it on top of a square white cloth. The white mark on the dry grass of the parade ground was to show Orville when he crossed the starting line, from which he was to be timed.

Then Orville and Lieut. Foulois, who was to be the passenger, started the motor. It skipped several times and needed some adjustment to the spark-timing before it would operate satisfactorily. At last all was ready. Lieut. Foulois climbed into the middle seat, next to the motor, and Orville, dragging his cap down over his eyes, took the driver's seat. The motor speeded up, and the propellers threw a hurricane of wind behind them.

"All ready!" shouted Wilbur; Orville nodded, and released the starting clutch. The aeroplane slipped easily down its rail and swept across the field, very close to the ground. To many of the spectators it seemed that the start was a failure. But on the turn near the balloon shed Orville tilted his forward plane and the machine rose gracefully. A cheer broke from the spectators. Two circuits of the field the machine made, rising higher and higher, until at an altitude of 150 feet he crossed the line and shot away to the south. The time was 6:48:30.

The first balloon at the two-and-a-half-mile mark was easily visible, and the fortunate spectators with field glasses could make out the second at Shuter's Hill. The aeroplane was seen to head slightly to the west to meet a cross wind from that direction, but soon after was lost to sight. The two narrow edges of the planes are all it presents to the view, and they are very hard to distinguish in the twilight at any distance. The spectators at Ft. Myer had to wait some ten minutes before the keenest-eyed among them could distinguish those two thin lines against the gray sky.

Then came the most dramatic moment of the flight. As the aeroplane was crossing the deep valley that lies across the course nearest to Ft. Myer, it suddenly plunged downward and disappeared behind the hill. A downward draft of air had caught it and pulled it down from its path. The crowd remembered the accident last year, and held its breath. But soon the machine came in sight again, struggling up the hill of air with the propellers whirling at full speed. After the first gasp of relief there was frantic cheering. That was the last incident of the flight. The aeroplane swept on toward the parade ground at express train speed, crossing the line again at 7:03:10, made a sweeping circle about the field and settled to earth as lightly as a drifting leaf. The cavalrymen had all they could do to keep back the crowd that would have rushed out to congratulate the successful aviators.

Later in the evening reports came in from Shuter's Hill. The army field telephone had refused to work, and there had been no means of communication with Ft. Myer. The aeroplane had appeared over the tree-tops almost unexpectedly. The officers of the Aeronautical Board were still struggling with the refractory 'phone when a trooper dashed up on the gallop and announced that it was in sight. The machine swung a wide circle around the balloon that marked the turning point, nearly 300 feet in the air, and then tilted the planes and rose even higher as it straight-

ened out for the return trip. It had disappeared over the hills in less than a minute after it first came in sight. Orville seemed as much at ease as if he were driving an automobile, and Lieut. Foulois held his field glasses steadily to his eyes.

The elapsed time of the flight was about 14 minutes and 40 seconds, but the official time will be less than this, as the turn around the balloon at Shuter's Hill is regarded as a control. For some reason the board declined to give out their time, but announced the average speed as 42.58 miles an hour.

The Wrights Planning for the Future.

WASHINGTON, D. C., July 31—The Wright brothers and Miss Katherine Wright left to-night for Dayton, O., bearing among them a Government order for $30,000 in payment for the aeroplane. Before their departure the brothers submitted to an interview, during which Orville said that had it not been for the troublesome cross wind and the down-draft in the valley on the return trip the aeroplane might have averaged a speed of better than forty-five miles.

Wilbur Wright had a long conference with General Allen, of the Signal Corps, and although neither would make any statement, it is believed that the army chief wished to know whether the Wrights would not furnish aeroplanes on future orders at about one-quarter of the present price. Orville was authority this morning for the statement that the price of aeroplanes for private individuals will be about $7,500. The heavy price paid by the Government may be regarded as a penalty for the extremely severe tests required. An aeroplane is already being manufactured at Dayton for Russell A. Alger, of Detroit, and many other amateur aviators have filed orders. The brothers, however, have adopted one rigid rule—that they will never sell an aeroplane to any man unless he shows a marked aptitude at controlling it.

As soon as the brothers return from Dayton they will begin the training of the Signal Corps officers in the management of the aeroplane. For this purpose a tract of land has been selected in Maryland, just below Washington, which is much better fitted for use as a training ground than Ft. Myer. The brothers also have a contract to demonstrate their machine for the German government. It is probable that Orville will undertake this alone, while Wilbur remains at Washington.

GERMAN AERO SHOW IN PROGRESS

FRANKFORT, GERMANY, July 29—The first international aeronautical show ever held is now open at Frankfort-am-Main and will continue till the middle of October, forming the center for tests and ascents of numerous new dirigible balloons and aeroplanes. The new central exhibition hall is flanked by a variety of sheds for the accommodation of airships already arrived or on the way. Conspicuous among these is the mushroom-shaped hangar of the Gans-Fabrice aeroplane. A spacious test ground has been laid out, but up to the present time the weather has rendered it impossible to hold any of the competitions for balloons, aeroplanes or dirigibles in which the program is so rich. No less than 450 exhibitors have taken a share in the proceedings.

In the central hall attention is at once drawn to the fully inflated balloon "Preussen," which fills up the space under the doomed roof and which holds the present height record of 10,500 meters, accomplished in 1901 during a meteorological survey. Then the Krupp and Ehrhard stands with their balloon guns are of no little interest. Krupp, however, believes that guns are of no avail for fighting airships and that it is a case of setting a thief to catch a thief, a prognostication that brings aerial warfare within the bounds of possibility.

The aeroplane section is rendered interesting by the presence of a Wright flyer; a second one will be used in the outdoor department for demonstration work. There are also to be seen the Voisin and Gans-Fabrice aeroplanes, the Grade flyer, the Lilienthal monoplane lent by the Munich museum, propellers, models innumerable, aerial motors, scientific instruments, diagrams, parts and accessories. The Continental Rubber Company, which made the envelopes for Zeppelins II, III and IV, the second Parseval, etc., is showing its balloon materials, as are also Metzelers, Clouths and Peters.

Outside around the aviation park the sheds are grouped, the Zeppelin home being by far the largest of all. Zeppelin III is expected to arrive late in August when Count Zeppelin will gives a series of tests, without carrying passengers.

"SILVER DART" AEROPLANE IS WRECKED

OTTAWA, ONT., Aug. 2—The aeroplane, "Silver Dart," with which W. W. Baldwin and J. A. D. McCurdy made many successful flights at Baddeck, Nova Scotia, last winter, was wrecked this morning at Petewawa Military Camp, where trial flights were in progress for the Canadian government.

The aeroplane had made four successful flights of half a mile each at a speed of more than forty miles an hour, with both aviators on board. On landing from the fourth trip the sun rising over the hills shone squarely in their eyes, and as they were descending the machine struck a knoll, ricochetting and striking again with such force as to wreck the wings and controlling apparatus. The two operators escaped with a few scratches and bruises, and were enthusiastic over the performance of the machine before the accident. They already have a new aeroplane under construction.

The "Silver Dart" was the product of Prof. Alexander Graham Bell's experimenting association, which built several machines at Hammondsport, N. Y., before moving to Nova Scotia. Glenn H. Curtiss, at present engaged with his aeroplane at Mineola, L. I., was formerly with the association.

HERRING AND GOVERNMENT DEADLOCKED

WASHINGTON, D. C., Aug. 2—Apparently the War Department will be content with the Wright aeroplane this year. Gen. James Allen, Chief Signal Officer, said to-day that he had heard nothing further from A. M. Herring since he notified him last Saturday that his contract could not be extended again. Mr. Herring's time for delivering the aeroplane expired last Saturday. General Allen says that he was sure no more aeroplane contracts would be let this year.

Reports from Mineola, L. I., say that Mr. Herring has his aeroplane nearly ready for trial. He says that he will demonstrate what his machine can do and that if the Government wants it he will be prepared to deliver it by September 1. If the Government does not want it, Mr. Herring asserts that he will be able to dispose of it to a foreign government.

Where the Nation's Chief Executive Witnessed the Flight

Seated in the President's tent, from left to right, were Senator Aldrich, of Rhode Island, President Taft, Representative Payne, of New York, and General Edwards.

SIMPLEX WINS BRIGHTON'S "24"

The Simplex Camp

"Wag" as the "Man with the hoe"

Robertson and Poole.

When the Struggle was at its height

Simplex winner, and Rainier runner-up.

Among those who Officiated.

Waiting for Something

HOW THE BRIGHTON BEACH RACES WERE CONDUCTED

NEW YORK, July 31—Sport lovers of the metropolis turned out 15,000 strong to see George Robertson and Al Poole with the Simplex to-night win the Brighton twenty-four hour race. The score was but 1,091 miles, eighty-six miles below last year's record. The Rainier, driven by Disbrow and Tund, after a steady and consistent performance, finished second, with 1,041 miles to its credit. The Palmer-Singer, another conservative, made 968 miles under the guidance of Howard and Lescault. The Stearns and the Lozier, after providing most of the excitement and fast driving, had to be content with fourth and fifth respectively, their scores being 919 and 885 miles. Fiat and Haynes did not finish.

Robertson was picked to win before the start, and was the popular favorite. After the Fiat met with an accident early Saturday morning he had a long lead over all the other competitors, and settled down to a steady grind. Had it not been for the exciting brush between the Stearns and the Lozier in the last few hours the race would have been very dull. But these two, although they had long given up all hope of winning set out to show a little speed, and succeeded beautifully. They lapped the leaders time and again, and drew forth the only real enthusiasm of the day.

Start and Progress of the 24-Hour Contest

The race began at 9:05 o'clock Friday night. The stands were crowded, and a solid row of automobiles lined the parking enclosure. In the glare of electric arcs and calcium lights it made a very picturesque and exciting scene, just the sort to attract the evening crowds at Brighton and Coney Island, as well as the more fastidious automobiling contingent. This was the line-up:

1—Acme, 60, Cyrus Patschke and H. A. Vantine.
2—Lozier, 50, Ralph Mulford and Harry Cobe.
3—Simplex, 50, George Robertson and Al Poole.
4—Blank.
5—Stearns, 30-60, Laurent Grosse and J. B. Marquis.
6—Palmer-Singer, 60, Ray Howard and Frank Lescault.
7—Rainier, 45-50, L. A. Disbrow and Charles Lund.
8—Fiat, 45, Ralph De Palmer and E. H. Parker.
9—Haynes, 36, Frank Sweigert and John Looney.

Robertson made the quickest start and took the rail on the first turn, closely followed by the Stearns, and held the lead for six miles. Then the Stearns drew ahead. Its time for the ten miles was 11:29 4-5. On the twenty-third lap it met with trouble and retired to the paddock, leaving the Fiat in the lead with Simplex second. De Palma made fifty-three miles in the first hour. About midnight the Stearns, which had returned to the track, met with the accident that put it out of the running. Marquis had just relieved Grosse at the wheel, and on his first lap, driving fast to catch up with the leaders, he took the turn into the homestretch at such speed that the car turned turtle. Robertson was just behind, and had to do some quick work to avoid running into the wreck. Neither Marquis nor Lang, his mechanic, was seriously hurt.

The Fiat had tire trouble at intervals, and finally hit a fence post, which strained the front axle. As it fell behind the Simplex drew further and further into the lead. On the tenth hour it was twenty-three miles ahead of the Rainier, now in second place, and fifty miles ahead of the Fiat. The Rainier was running steadily, but had not the speed to overhaul the red car. From this time on the race was featureless. In the afternoon the Acme came from the paddock after an extended vacation and did a little fast driving, but soon had to retire again.

By 5 o'clock in the afternoon the track was so badly cut up on the turns that the race had to be stopped while repairs were made. The management had advertised that the race would be run without intermissions, but they claimed that the police demanded that the track be put in better shape. The turns at each end of the homestretch had been worn into deep ruts, and the dust was blinding; the only part in condition for fast time was the backstretch. The intermission lasted an hour, during which the cars were kept "in control," and no working on them was permitted. The drivers, however, were glad of a chance to rest, and many of the crowd took the opportunity to get supper.

When the race was started again only five cars were in line. The Haynes had quit in the fourteenth hour with a broken crankshaft, and in the seventeenth the Fiat's damaged axle forced it to retire also. The Acme was in the paddock, but not officially out. Poole, now in charge of the Simplex, set a pace of about thirty-five miles an hour, and the Rainier and Palmer-Singer, who now were sure of second and third places respectively, followed him. This was good generalship, but not calculated to please the crowd. The Stearns, however, gallantly started to furnish some excitement, and in this entertaining effort it was soon joined by the white Lozier. In the darkness the two tore around the track at real racing speed, repeatedly passing the trio of conservatives and drawing hearty applause from the grandstand.

In spite of the fact that the prices had been nearly doubled over last year, a big crowd of Saturday evening pleasure seekers turned out, and by 8 o'clock the capacious grandstand was full. Automobiles occupied all points of vantage and kept up a continuous honking. The track was well illuminated, and the racers with their glaring headlights made a fine spectacle. The performance of the Lozier was particularly impressive. Both car and drivers were garbed in dusty white, giving it a ghostly look as it swept past the stand; and then the dark Stearns with its roaring exhaust furnished the right contrast.

When only a quarter of an hour remained Robertson again took the wheel of the Simplex and undertook to win a share of the applause. He reeled off some fast miles, and by his example aroused the Rainier and the Palmer-Singer, so that at its finish the race was quite exciting.

Friday's Preliminaries Had Several Smashups

The usual preliminary events on Friday afternoon furnished several accidents. The first race, for motorcycles, had hardly started when Fred Voelker, on his 7-horsepower N. S. U., made a dive through the canvas fence on the turn into the homestretch. A moment later Edward Seery, also on an N. S. U., went through the same hole and bumped into Voelker. Both drivers were bruised and scratched.

The 100-mile Marathon saw the only broken record of the meet, Lorimer's time of 1:52:00 3-5 being over a minute under the mark set by Clemens and a National. Soon after the start of this race the Midland skidded through the fence on the dangerous turn into the homestretch. The crew escaped injury, and the car was patched up in time to re-enter the race and take third place. The Kisselkar and the Acme, the only other competitors, had tire trouble and withdrew. The mile and five-mile time trials were slowed down because De Palma, the principal competitor, was saving his car for the twenty-four hour race.

William Pickens, the manager of the Buick racing team, protested the action of the Motor Racing Association in limiting the 100-mile and twenty-four hour races to cars costing over $2,000, thus barring the Buicks. He said that the whole Buick team, with two cars, was in New York, and would have entered both these races if they had been permitted. Certainly entries were sadly needed. Of the sixteen cars, which, it had been predicted, would start in the twenty-four hour race, only eight appeared, and most of the time half of these were in the paddock. If the entry list had been full, the track could never have stood the wear. Unless some strenuous measures are adopted,

the next twenty-four hour race will have but scant support.

Later the M. R. A. announced that the next twenty-four hour race would be held August 27-28, and further said that fourteen entries had been pledged, mostly by members of the association. Summaries of the various events follow:

Ten-Mile Motor Cycle Handicap—Won by Stanley Kellogg, Merkel; time, 10:16 2-5; J. F. McLaughlin, N. S. U., second; F. B. Baker, Indian, third.

Mile Time Trials—Ralph De Palma, Fiat; time, 0:54 3-5; Louis Chevrolet, Buick; time, 0:58 2-5; Charles Bowers, Red Dragon; time, 1:06 4-5.

Fifty Miles, Cars $1,251-$2,000—Won by Louis Chevrolet, Buick; time, 59:39 2-5.

Five Miles, Free-for-All—Won by Ralph De Palma, Fiat, 5:51 3-5; Charles Bowers, Red Dragon, second.

Five Miles, Cars $851-$1250—Walkover for E. M. F.

Brighton Marathon, 100 Miles, Cars $2,001-$3,000—Won by Lee Lorimer, Chalmers-Detroit; time, 1:52:00 3-5; John Juhasz, S. P. O., second; W. O. Stokes, Midland, third.

TABLE SHOWING PROGRESS OF THE RACE AND STANDING OF COMPETING CARS AT END OF EACH HOUR

Car — Hours—	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Simplex	47	102	153	197	246	295	343	391	440	490	539	589	636	680	724	765	811	855	896	938	980	1017	1052	1091
Rainier	46	95	143	193	238	287	331	372	421	467	513	554	601	644	685	724	766	813	852	888	927	968	1001	1041
P-S	45	90	136	178	224	264	305	348	386	427	472	507	543	589	628	668	706	745	789	820	862	895	930	968
Stearns	51	101	141	141	141	182	228	273	299	353	362	406	447	495	538	580	625	671	715	758	795	838	876	919
Lozier	48	95	138	176	219	267	298	298	317	323	371	420	466	505	551	597	645	685	729	760	769	797	805	885
Acme	41	87	123	129	158	199	222	232	283	310	310	310	310	320	320	322	322	322	352	385	385			
Fiat	53	104	154	204	254	292	343	366	391	440	486	537	580	623	654	678	691							
Haynes	41	86	122	122	122	122	122	122	122	122	144	164	205	219										

PRESIDENT MAY FIND RACES MORE ATTRACTIVE THAN GOLF

LOWELL, MASS., Aug. 2—Although President Taft has not yet been able to definitely signify his acceptance of the invitation of the Lowell Automobile Club to be its guest at the big race meet, to be held over the Merrimac Valley course, during the week of September 6, the specifications for the main grand stand that is to be erected call for a Presidential box in front of the main pavilion. They also show the 100 boxes that will occupy the lower part of the stand, and beyond these boxes will be arranged seating capacity for 5,500 spectators. Other stands will be erected along the course.

The stands for the judges, the press and the musicians will be erected on the opposite side of the course, and connected with an overhead bridge to the main stand. A special bridge will be constructed over Dunbar avenue and above the course, to permit entrance and exit after the races have been started. The Boston & Maine Railroad and the Boston & Northern Railway parallel the course, but upon the opposite side of the Merrimac River. In order to give direct transportation, the War Department has been asked to sanction a plan for erecting a pontoon bridge, the river being United States waters. The total cost of running off the program is estimated at $50,000, exclusive of the Vanderbilt Cup race, provided it should be decided to run that race over this course.

The Lowell carnival will be officially opened on Saturday evening, September 4, with a banquet by the Lowell Automobile Club, at its new club rooms, which occupy one entire floor in the Richardson Hotel. The racing program, as arranged by days, is as follows:

Monday—250-mile road race, for light stock cars.
Tuesday—Mile straightaway records.
Wednesday—318-mile race, for large stock cars.
Thursday—Athletic events.
Friday—Motorcycle races under F. A. M. rules.

The course is now undergoing a thorough oiling, and the back stretch, which last year was rough in spots, is rapidly assuming track smoothness under the combined labors of 250 workmen. The course will be guarded by a military patrol, and a complete telephone system will connect all points of the circuit. Every precaution will be taken to insure the safety of both the contestants and the public.

FOREIGN CARS ELIGIBLE IN FAIRMOUNT PARK RACE

PHILADELPHIA, Aug. 2—After thoroughly considering the question from every angle, the contest committee of the Quaker City Motor Club, under whose auspices next October's 200-mile Fairmount Park stock chassis race will be run, has decided to accept foreign cars as entrants, with the proviso that they be owned by Americans. The committee was about evenly divided as to the advisability of this action, but when the fact was emphasized that the exclusion of foreign cars would be attributed by some to a fear of the result, the "antis" flopped over in a body, and the final vote in favor of their admission was practically unanimous.

The race will be run on Saturday, October 9, probably in the afternoon. Twelve hundred of Philadelphia's "finest," with miles of rope, will furnish a replica of the course-guarding which so surprised and delighted visitors last year, and set a standard in this respect which other race promoters have vainly endeavored to equal.

Mayor Reyburn, who, with Frank B. Hower, of the A. A. A., has been named as honorary referee, is intensely interested in the affair, and is devoting no little time to perfecting the details. The committee which will represent the club in its dealings with the representatives of the charitable institutions which will participate in the distribution of the receipts consists of Frank Hardart, Sr., Chairman; Fred. C. Dunlop and William J. Donnelly.

Not only will the Quaker City Motor Club not benefit financially from the sale of parking spaces, seats, etc., but the club has asked for the reservation of fifty parking spaces at the rate decided upon by the beneficiary institutions' committee, and a check therefor will be sent to the proper person as soon as the Mayor names the committee.

The contest committee finally decided on the disposition of the $5,000 cash (or plate, at winners' option) which will be distributed among the first four cars to finish, as follows: $2,500 to first; $1,250 to second; $750 to third; $500 to fourth. In addition, there is also heard from some of the public-spirited "laymen" who have already become deeply interested in the race and its charitable feature, a suggestion that additional enthusiasm might be aroused by newspapers, prominent business concerns and others hanging up trophies for fastest lap, consistent running, best tire record, etc. This suggestion has already been acted upon and there will be at least two such trophies in addition to the $5,000 in "frigid gelt" which the club has hung up.

On Saturday, just one day after the entry blanks were mailed, Secretary Harbach received the first entry—that of an Acme car with Malin Leinau nominated as the driver.

Start of the "Water Rats" from Charing Cross, London, for Brighton

LONDON, July 24—While the Paris Salon will not be held this year, the Olympia Show will take place in November, as usual, and judging from present indications, a most successful show it will be. Improvements have been recently made in the building, with the result that there will be room for over 150 stands on the ground floor, as well as the accessory exhibits in the galleries. The whole of the available space has been applied for, and there seems to be no doubt that Olympia will be the business center of the European automobile trade for the coming winter.

The Grand Order of Water Rats, some 300 strong, went down to Brighton Sunday, the 4th, on a hilarious automobile trip. This order, it may be well to explain, is composed not of rodents, but of members of the "profession"—theatrical; a Good Samaritan free masonry, with a rare capacity for enjoying itself. The order assembled 68 cars, and after a headlong dash for the seashore, lunched at the Metropole with much merriment and speechmaking. Harry Tate, whose comic struggles with a refractory automobile convulse the vaudeville audiences, acted as marshal, and Fred Ginnett, as King Rat, had a huge gray "property" rat perched on the hood of his car.

The headlight trials of the R. A. C., which were held last week, attracted a number of entries, and although the results have not yet been published, there is reason to believe that they will be very interesting to automobilists. Special prominence is given in the rules to the reduction of the dazzling effect, about 36 per cent. of the total marks depending on this feature. For effectiveness of illumination 54 per cent. is set apart, and the remainder goes to practical and mechanical considerations. All the acetylene jets, electric bulbs, etc., were previously tested to find the amount of light available; the trials determined what part of this was effectively used in service. The photometer test was held in the Crystal Palace grounds on Monday and Tuesday evenings. American makers were represented by the Badger Brass Company and Rushmore Lamps, Ltd.

The R. A. C. itself is steadily increasing in numerical strength, and the total of members, ordinary and associated, is over the 16,300 mark. The number of associated automobile clubs is over 96 and still increasing.

A SCHEME FOR INTERNATIONAL TOURING RECIPROCITY

PARIS, July 28—Europe has a scheme in hand which, if carried to completion, will make touring through her various countries a matter of less formality than motoring through the various states of the Union at present. Under present regulations it is necessary to have as many driving licenses, as many registration numbers, and pay as many entry fees as there are countries in which you desire to travel. If the new scheme is carried through, a driving license issued by any European country will be recognized in every other country; a car registration in one land will be good for all other lands; finally, the deposit of one sum will procure an international triptyque, admitting to all European countries, the sum being returned on the car's return to its native country.

America has as much reason to be interested in the scheme as Europeans, for her citizens form a very respectable percentage of the international tourists who skim over the highways of France, Germany, Italy, England, Holland and Austria. Curiously, however, America is the only nation that is out of the scheme; it is more than probable, however, that she will shortly be admitted.

The idea of simplifying touring regulations originated in Germany in 1907, the German authorities suggesting to the French that as they were at the head of the automobile movement they should call a conference of the leading powers to deal with the subject of international regulation. The French government accepted the proposal, and in due time invited government officials of other countries to meet her and talk over this subject. Other nations became interested, asked to be admitted, and were admitted, with the result that the proposed conference was postponed on several occasions. Now every nation in Europe, without a single exception, is enrolled in the scheme, and should have met in Paris this week, at the Ministry of Foreign Affairs, had not Belgium and Holland asked for a postponement, which was granted, the revised date being October 5.

Three main points will be brought before this meeting of the nations. It will be proposed that the driving licenses of any nation shall be accepted by all other nations. At present most European countries issue driving licenses only after a practical examination. The exceptions are Belgium, which has no special regulation, and England, which, like New York State, is only interested in receiving the registration fee, and does not care a rap about the applicants' ability or otherwise to handle a car. France will accept the British Royal Automobile Club's certificate and the Motor Union's license as proof that the holder can drive a car, but, of course, will not accept the British government's license. Germany will accept the French license providing it is endorsed by a German consul, but not otherwise. An American driving license would not be accepted anywhere in Europe.

After each nation has put its house in order and instituted a driving license issued only after examination, as in France, Germany and Italy, it is proposed that such license shall be recognized by all the countries of Europe without further examination or formality. Here America is directly interested, for a

tourist who is going to "do" the Continent would only have to obtain one license for all the countries he intends to visit. If America comes into the scheme, even her license may be recognized by European countries.

A similar arrangement is proposed regarding registration numbers. At present, if driving in France you must carry French numbers, though you are not called upon to pay French fees. If you tour in England you must carry English numbers and pay full fees whether your stay is one of six hours or six months. In Belgium you hook on that country's number in addition to your own. In some other countries the customs officers give temporary numbers that must be attached and maintained while touring in that country.

The object of the conference is to devise a scheme whereby one registration number will be accepted all over Europe. It is not a difficult task, providing each of the contracting parties will undertake to look after the few black sheep that are to be found in every community. Here again America is directly interested, for whereas a United States number is sometimes admitted to be used in France for a short period—the holder being given a certificate to that effect to save trouble with the police—under the new scheme such a number would always be admitted, not only in France, but in all European countries.

The question of an International Automobile Passport, as suggested by the Touring Club of Italy, is even more important Under the old method of touring it was necessary to deposit the duty on a car on entering the country, the amount being returned on leaving. The result was that plenty of gold had to be carried in the coinage of the land the motorist was about to enter, and there were long delays when leaving the country, for unless the station was an important one the officers never had the amount of cash on hand. This, of course, was repeated for every country visited. At the present time the automobilist can deposit the customs duty with the Touring Club of France, and various other organizations, even before leaving his home land, receiving in return a triptyque which admits him free and without formality. A separate triptyque must be returned for each country about to be visited, and separate fee deposited, the amounts being returned either at the central office or through the holder's banker at home.

Under the Italian Touring Club's scheme there would be but one triptyque for the whole of Europe, the amount to be deposited being that of the country with the highest duty. This amount would be deposited with the home authority on issuing the triptyque, and only returned when proof had been given that the car had been brought back to the country of its origin. In the meantime it might pass through half a dozen different countries without depositing a cent.

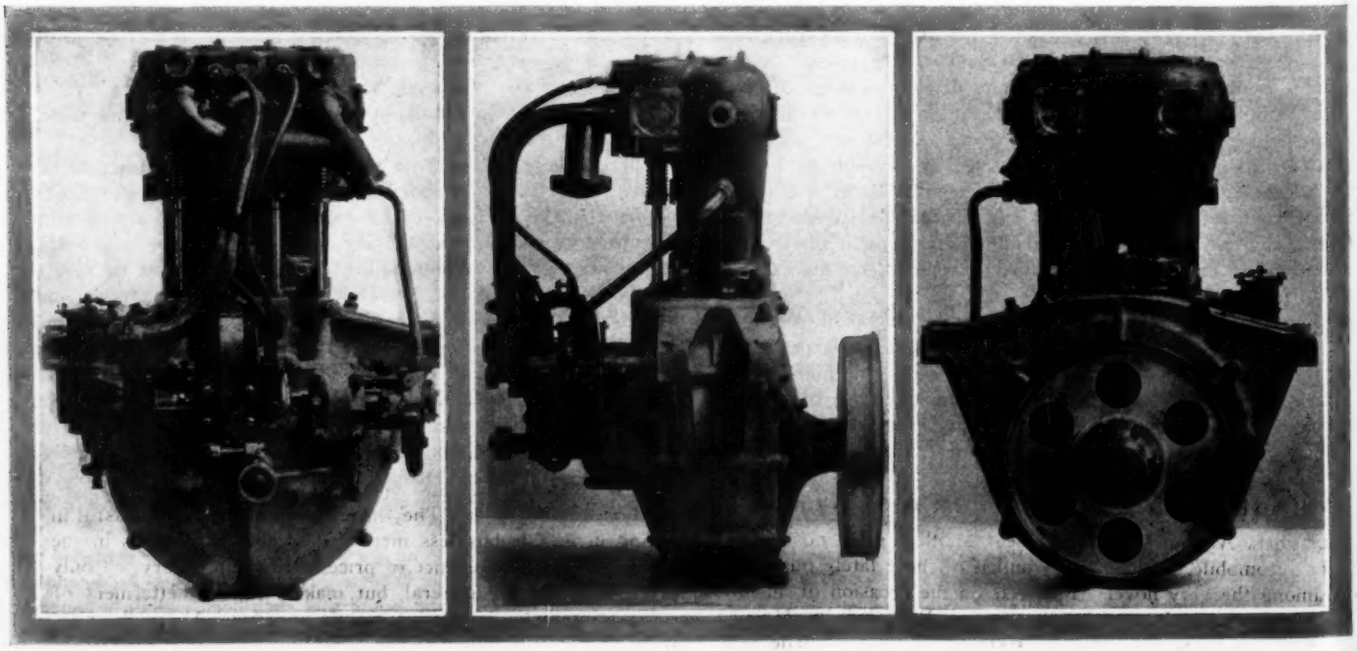
This scheme also interests Americans more than any other nation, for they travel in more different countries than the average European, who, as a rule, is content to confine his operations to one land at a time. The scheme, bold as it is in the eyes of red-tapeism, does not present any serious difficulties of realization.

The important point about the conference to meet in the Fall is that it is not composed of delegates from automobile and touring clubs, limited to the expression of their ideas on what should be done, but is made up of official delegates appointed by the various governments, having power to vote in favor of any practical scheme. Automobiling is growing to such an extent that it is fast breaking down the artificial barriers which have existed in old Europe for generations.

TWIN CYLINDER OF FRENCH PRODUCTION

PARIS, July 21—More than local interest attaches to the new Lion-Peugeot two-cylinder motor from the fact that it is the direct outcome of the limited bore race regulations enforced in Europe for the last two years. The firm, in common with such others as Sizaire-Naudin, Delage, De Dion, Werner, etc., has specialized in the one-lunger, and has indeed never previously built an engine with multiple cylinders. For the present racing season three cars were experimented, two of them having one cylinder only, of 3.9 inches bore by approximately 10 inches stroke, and the third a twin cylinder in V. Out of three races the twin has been victorious in two, and finished with second place in the third one. Doubtless with their abnormal stroke and immense valve—three inlets and three exhausts for one cylinder—the singles were a trifle faster than the twin, but this latter possessed such qualities that the firm felt justified in adopting it as their standard model for next season.

The two cylinders are in a single casting, and are only very slightly inclined, the angle from the vertical being 20 degrees. They are set across the frame, and not lengthwise, as in the standard vertical twin cylinder engine, the valves, magneto, carbureter and pumps being in front. This construction allows of an engine so compact that it can be mounted on the same chassis as the one-lunger without any changes whatever. The



As seen from the front — A view from the side — As seen from the rear

Lion Peugeot Two-Cylinder Motor Which Has Created a Sensation in European Racing Circles

crank case is of the single-cylinder type; that is, it is divided vertically, the two halves being united by horizontal bolts. Interior flywheels are employed, with a built-up crankshaft, as in the singles, the two connecting rods being attached to one pin, one of the rods fitting on direct, while the other has a forked end.

Although the cylinders are inclined, the valves are vertical, and are all in one line, as will be seen from the illustration, at the front of the engine. The two exhaust valves are at the outside, while the two inlets are together in the centre. A single camshaft operates all the valves, and is fitted with a couple of supplementary sliding cams for relieving the compression in order to facilitate starting. A pinion on the camshaft meshes with a pinion on a secondary shaft, on which are mounted the magneto and oil and water pumps. The carbureter is also at the front of the engine and to the left of the magneto, in a thoroughly accessible position. There is a single length of intake piping for the two cylinders, entering the intake manifold cast with the cylinders midway in the block. As this "buried" manifold is heated by the circulating water, the mixture is warmed before entering the cylinders, thus avoiding any necessity for jacketing the carbureter.

One of the most interesting features of the engine is the ratio of bore to stroke. On this motor the cylinders are 75 by 150 millimeters (approximately 2.9 by 5.9 inches), which is a ratio of two to one. Certainly but for the experience gained in the limited bore races, such a long stroke would never have been adopted on a standard pleasure car. On their present single-cylinder models, indeed, Lion-Peugeot employs a "square" engine of 110 by 110 bore and stroke. The experience with their racers, where the stroke was carried up to a value two and a half times that of the bore, has led them to adopt the long-stroke engine for pleasure car models. This model would also appear to indicate a tendency to break away from the single-cylinder model which has been so strongly developed in France during the last two or three years, and has been brought to a wonderful degree of efficiency, making it far removed from the noisy spasmodic creations of a few years ago. There is now practically only one firm of importance producing single-cylinder engines only. On the other hand, there is hardly an important firm in existence in France which does not build, if not one-lungers, at any rate some two-cylinder engines. In the few cases where large four-cylinder engines are alone produced it is because of innate conservatism of the management, or for financial reasons that the company would not care to make public.

NEW FIRM GETS LARGEST TRUCK ORDER

Worcester, Mass., Aug. 2—Probably the largest truck order ever placed was that which General Samuel Pearson, representing the American-South African Commerce Company, Johannesburg, has just given the newly-formed R. L. Morgan Company, of this city. This is for 100 trucks, to cost $3,500 apiece, and be delivered, 20 per year, until the contract is filled, if it is not increased in the meantime. The first car is to be delivered on September 1 to the company, which conducts an immense mining and development business in South Africa. The trucks will be used for hauling ore and supplies to and from the mines. Previous to placing the order, the company's representative, General Pearson, known to fame as the Boer army purchasing representative, journeyed from the American headquarters, at Allentown, Pa., to the factory in Worcester, which latter was inspected in detail.

SIXTEEN AUTOMOBILES IN A SEWER

Baltimore, Aug. 2—Every day sees another most novel use for the automobile, and a "stunt" pulled off here lately ought to rank among the very novel. This was on the occasion of an inspection of the city's new trunk sewer. Preceded by Mayor Mahool in a Winton, no less than sixteen automobiles made the six-mile trip, the way being lighted by powerful searchlights.

WHEN A TIRE SHOULD NOT BE RE-TREADED

Chicopee Falls, Mass., Aug. 2—That 90 per cent. of the old tires that are re-treaded ought not to be, as far as the owner's interests are concerned, is the opinion of one of the Fisk Rubber Company's experts. An autoist may have a casing that has given him a few thousand miles of good service and is still apparently in good condition. He consults the manufacturer of the tire in regard to having it re-treaded, and is advised against it, on the ground that the inner fabric is weakened. The autoist, unheeding, goes to some alleged tire expert, who perhaps has served a few months in a garage before branching out in business for himself, and is told that the company is all wrong. When this repairer does the job, as a rule only the cheapest quality of scrap rubber is used and the crudest methods employed. Should the re-treaded tire last only a week or so, the autoist has no redress from the repair man, who does not guarantee his work, and coolly says, too late, that the tire "was no good in the first place." He has no reputation to lose and is not greatly worried.

The great essential point in the life of a tire is proper inflation. Users of Fisk tires who have driven them 5,000 miles or so properly inflated, frequently bring them back for re-treading, and in this case a serviceable job is possible and the tire will be good for a few thousand miles more. But if a tire has not been driven at the proper degree of inflation, it is almost certain that the fabric has been so strained that re-treading will be useless. A real expert knows what to advise in such cases. The ordinary garage or repair man goes ahead and re-treads, anyway—and collects for it.

MAXWELL TRANSCONTINENTAL TRIP ENDS

San Francisco, Cal., Aug. 2—After just 35 days of touring Mrs. John R. Ramsay, of Hackensack, N. J., drove her Maxwell car into San Francisco, completing the first transcontinental automobile trip ever made by a woman. Not only did Mrs. Ramsay successfully make the tour of nearly 4,200 miles, but she drove the car from start to finish, made all adjustments and changed the tires when necessary. From Laramie, Wyo., where their progress was last reported, the going was bad. Deep washouts, long since dried, some of them 10 or 12 feet deep, had to be traversed. When Salt Lake City was reached on July 19 a sight-seeing trip of several days was enjoyed by the ladies before resuming the journey westward. In some respects the trip to Reno, Nev., was the hardest part of the tour, for in addition to the hard climbs over the Sierra Nevada mountains, made doubly hard by the rough roads and underbrush, much loose shifting sand was met with. From Reno to Sacramento, Cal., there were some rather stiff grades to climb, but once in sight of San Francisco and the Golden Gate all difficulties were forgotten.

STEP TAKEN TO CHECK PRICE-CUTTING

Buffalo, N. Y., Aug. 2—Pursuant to their announced intention of reducing the objectionable price-cutting habit to its lowest possible terms, the Weed Chain Tire Grip Company, of New York City, announce that they have secured a restraining injunction in the Federal Court of the District of Western New York against the International Automobile League of Buffalo from selling Weed chain tire grips or parts thereof at lower prices than those marked on the bags containing the grips, or upon the Weed price-list.

The Weed people are the first to make successful fight against the International Automobile League, and their victory should receive the endorsement and support of every fair-minded motorist and accessory dealer. They have been uniformly successful in insisting upon fair business methods, have been pioneers in the struggle for the maintenance of prices, and their victory not only protects the trade in general, but makes for the betterment of every one interested in the automobile industry. Although price-cutting as a rule is objectionable, it must be admitted that many automobile accessories are listed at exorbitant prices.

WESTERN AUTOMOBILE BLUE BOOK

This week Volume IV of the Blue Book series, broadly covering the Middle West, is issued by the Automobile Blue Book Publishing Company, of New York and Chicago. Its routes begin at Buffalo and extend in a general way to the Mississippi and Missouri rivers.

By a far stretch this is the largest and most important route compilation ever attempted west of Pittsburgh, and the through lines of the route contain 20,800 miles of routes, nearly all of which were covered in the spring and early summer by the Blue Book cars. For every mile of travel, odometer measurements have been taken, and other data sufficient to enable the locally unacquainted tourist to travel the entire territory without trouble.

It is now possible for the owner of the Blue Books to leave almost any point in New England, New York State, Pennsylvania or New Jersey, and travel to Cleveland, Columbus, Cincinnati, Louisville, Indianapolis, Chicago, Detroit, Grand Rapids, South Bend, Madison, Wis.; Peoria, Galesburg, Davenport, Clinton, Cedar Rapids, Omaha or St. Louis, with facility. To further assist the tourist, 124 route maps and 79 city maps illustrate the 174 different routes. For the first time a general map has been made, giving in their proper geographical relation the main-traveled routes of Ohio, Indiana, Michigan, Illinois and portions of Kentucky, Wisconsin and Iowa.

By means of numbers placed clearly on the routes, it is possible for the user to find almost any route desired with a minimum of inconvenience, while initial and terminal points are cared for by an extensive "index of places."

The Automobile Blue Book Publishing Company has opened permanent headquarters at 1200 Michigan avenue, Chicago, where the full series of Blue Books will be kept permanently on file. They can also be had of the leading hotels, garages and booksellers in the principal cities, or from the Eastern office of the publishers, 239 West Thirty-ninth street, New York City.

BLUE BOOK ABSORBS N. E. RED BOOK

An important deal was consummated last week, when the publishers of "The Official Automobile A. A. A. Blue Book" purchased outright the entire route book and map business of F. S. Blanchard & Co., of Worcester, Mass., publishers of the "Red Book Automobile Guide of New England" and the "Pilot Maps." The "Red Book" will be consolidated with the New England section of the "Blue Book," and the information heretofore contained in the two volumes will hereafter be given in one.

Henry MacNair, the well known typographer, who prepared the routes and maps for the "Red Book," has joined the staff of the "Blue Book," and will continue his work in New England.

Tuesday of this week the New England road crew, consisting of E. R. Mixer and Mr. MacNair, started on the work for the "1910 New England Blue Book." Next week John Mixer and Robert Bruce will start in car No. 2 through New Jersey and the South, and car No. 3, in charge of John P. Dods, will leave Chicago to begin its work on the "1910 Middle West Book."

"El Toro: A Motor Car Story of Interior Cuba"—This is a story that is worth the reading, for, though it is written by E. Ralph Estep, advertising manager of the Packard Motor Car Company, and tells of a trip in a car of that make, the writer has not yielded in the least to the temptation to exploit the particular automobile in which he is naturally most interested.

Hence, he tells his story of Cuba brilliantly and interestingly, and it gives one the desire to tour in the "Gem of the Antilles." Of course, the book is profusely illustrated, and since no price is mentioned in its publishing, it is more than probable that the Packard Motor Car Company, Detroit, Mich., is prepared to supply a limited demand to those who may take the trouble to write and ask for the book.

THE AUTOMOBILE CALENDAR

Shows, Meetings, Etc.

Aug. 5-7.....Chicago, Midsummer Meeting Society of Automobile Engineers.
Sept. 21-23.....Cleveland, Good Roads Convention, American Automobile Association.
Nov. 6-13.....Atlanta, Ga., Auditorium-Armory, National Automobile Show.
Dec. 31-Jan. 7....New York City, Grand Central Palace, Decennial International Automobile Show; American Motor Car Manufacturers' Association, with Importers' Automobile Salon and Motor and Accessory Manufacturers. Alfred Reeves, General Manager, 505 Fifth Avenue, New York.
Jan. 8-15.....New York City, Madison Square Garden, Tenth National Show, Association of Licensed Automobile Manufacturers.
Feb. 5-12.....Chicago, Coliseum, Ninth Annual Automobile Show, National Association of Automobile Manufacturers. S. A. Miles, General Manager.

Races, Hill Climbs, Etc.

Aug. 5.....Chicago, Fourth Annual Algonquin Hill Climb, Chicago Motor Club.
Aug. 7.....Richfield Springs, N. Y., Hill Climb, auspices of the "Earlington."
Aug. 26-27.....New York City, Brighton Beach, 24-Hour Race, Motor Racing Association.
Aug. 26-28.....Minneapolis, "Little Glidden Tour," Minnesota State Automobile Association.
Aug. 19-21.....Indianapolis Motor Speedway, First Race Meet.
Sept. 6-11.....Lowell, Mass., Automobile Carnival, Lowell Automobile Club.
Sept. 10-11.....Baltimore, 24-Hour Race, Motor Car Racing Association of Maryland.
Sept. 15.....Denver, Col., Start of Flag to Flag Endurance Run to Mexico City.
Sept. 21.....Riverhead, L. I., Long Island Derby, Motor Contest Association.
Sept. 21-29.....Washington-Boston and Return, Munsey Reliability Run.
Oct. 7.....Philadelphia, Second Annual Stock Chassis, 200-Mile Race, Fairmount Park, Quaker City M. C.
Nov. 9.....Atlanta, Ga., Track Races, Atlanta Automobile Association.
Dec. 29-30.....Philadelphia, Fourth Annual Midwinter Endurance Contest, Quaker City Motor Club.

FOREIGN

Races, Hill Climbs, Etc.

Aug. 22-29.....France, Reims, Aeroplane Races and Grand Prix, Aero Club of France.
Aug. 24-29.....Belgium, Circuit des Ardennes, and Coupe de Liedekerke, Belgium Automobile Club.
Sept. 5.....France, Mont Ventoux Hill Climb.
Sept. 19.....Austria, Semmering Hill Climb.
Sept. 22.....Austria, Coupe Rochet-Schneider.

WASHINGTON-BOSTON PATHFINDER AT IT

WASHINGTON, D. C., Aug. 2—With entries coming in rapidly and the work of mapping out the route under way, the Munsey reliability contest is beginning to take definite shape. The following entries have been received during the week: Walter Cram, Mitchell; Carter Motor Car Corporation, Cartercar; Lambert Automobile Company, Maxwell; Olds Motor Works, Baltimore branch, Oldsmobile. This brings the total up to eleven.

The Chalmers-Detroit pathfinding car left Washington last Friday with the following party on board: Karl Schnorr, driver; Thomas S. Rice, George Deatel and D. E. Taylor. Rice will write the pathfinding stories, Taylor will do the picture work, and Deatel will arrange for hotel accommodations, gasoline supplies, etc. The pathfinders were given a great send-off. Before the start President Taft received them at the White House and was given a brief history of the car's achievements.

Charles J. Glidden, in a telegram to the managers of the tour, said: "I wish to extend my congratulations to Mr. Munsey for arranging a tour of this character, which will be of unusual interest. You are sure to have a large number of entries and can expect some from this tour after its finish in Kansas City."

AUTOMOBILE ENGINEERS MEET AT CHICAGO AUGUST 5

THE annual meeting of the Society of Automobile Engineers will be held at Chicago, August 5, 6 and 7, with headquarters at the Illinois Athletic Club, whose hospitality has been extended to all members of the society, with attending advantages, such as rooms for the members and living facilities. Members of the S. A. E. who are members of the I. A. C. will be the guests of F. J. Newman, chairman of the local committee of the S. A. E., and this, together with other calculating preparations at the hands of a very active local committee, must, as a natural sequence, result in an enjoyable visit of the members of the society.

Among other events of interest, to act as a magnet in drawing a large attendance, will be the annual hill climb, known as the Algonquin. This event will fall on August 5, and provision has been made for all members who may care to enjoy the ride. On Friday, when the members will be back from the hill climb, serious business and a fine selection of papers of a technical character will be presented. Visits to the shops of the industry in that locality will be made, and entertainment of a varied character is promised.

The society, now a four-year-old, has grown and prospered; its doings are heralded as of the greatest importance to the industry, and the membership is composed of the engineers and associates, who are largely responsible for the growth and stability of American-made automobiles. That there is a great advantage attending the Association of Automobile Engineers on a neutral basis is self-evident, and when standardization of parts is taken up at greater length it must be done under the direction and authority of just such a body, independently of any taint of trade affiliations.

That there is a demand for a society such as this is proven by the events in its history, dating from the struggle of its first president, A. L. Riker, whose privilege it was to wrestle with inertia which is bound to influence any new movement; after two years, Mr. Riker handed the reins to Thomas J. Fay, who, as second president of the society, held four meetings during that year and inaugurated a campaign of membership, ending in quadrupling the same. Henry Hess, the third and present holder of this important office, brings to bear a wealth of administrative ability and a zeal which promises to break all bounds. The committee work is in the hands of a band of workers of whom it may be said that failure is wholly unknown. The committee assignments, as promulgated by President Hess, are as follows:

Meetings—H. M. Swetland, chairman; H. E. Coffin, David C. Fergussen, A. L. McMurtry, F. J. Newman.

Finance—H. M. Swetland, chairman; B. D. Gray, W. S. Gorton, W. R. Wall, R. H. Whiting.

Membership—F. J. Newman, chairman; H. G. Chatain, James H. Herron, J. C. Perrin, John Wilkinson.

Publication—Prof. Rola C. Carpenter, chairman; H. F. Donaldson, Charles E. Duryea, E. A. Rutenber, E. T. Birdsall.

Papers—Prof. Rola C. Carpenter, chairman; H. F. Donaldson, Charles E. Duryea, C. B. Hayward, Herbert L. Towle.

Library—H. G. Chatain, chairman; Herold B. Anderson, J. M. Elsworth, Henry Souther, F. B. Stearns.

House—H. E. Coffin, chairman; A. C. Bergman, A. J. Moulton, Henry Souther, G. A. Wells.

In view of the large attendance, by the large Eastern contingent, the members concluded to engage a special car on the Twentieth Century Limited, over the New York Central & Hudson River Railroad, which left the Grand Central Depot at 3:30 P. M., on August 4. This contingent included many members from New England, although members from Boston, Worcester and vicinity preferred to go by a more direct route, by way of Albany. Buffalo is also well represented.

GOOD ROADS DELEGATES TO MEET AT CLEVELAND

CLEVELAND, Aug. 2—The large amount of road construction which is being done near this city gives it many advantages as a meeting place for the second annual National Good Roads Convention, which will be held here September 21-23 under the auspices of the American Automobile Association, the National Grange, the U. S. Office of Public Roads and the American Road-Makers' Association. The work of the convention in Buffalo last year attracted much attention among automobilists and engineers, and it is expected that as a result the delegates this year will be more numerous and more representative.

F. A. Pease, chairman of the Demonstration Committee, has made out a tentative plan of the exhibits of practical road work, and is now preparing a map of the city showing the different localities selected. Examples of almost every known sort of road construction are included.

East of Cleveland Heights the County Commissioners are building a brick road, the brick being four inches deep and laid on a four-inch concrete base, between Portland cement curbs that are molded in place. This stretch is about four miles long, and during the convention may be studied in all its stages, from sub-grading to completing the finished surface. Through the same village a new macadam road is being built, the surface being trap rock three inches in depth laid on a twelve-inch limestone telford base. Another extensive improvement is being made on Euclid Boulevard. Here the foundation is nine inches in depth, of crushed limestone, the surface to be filled with asphalt or coal-tar sufficient to render it impervious to water.

An illustration of economical work will be seen on Lee Road. The construction consists of six-inch blue sandstone, hammer-broken, and placed on the sub-grade as closely as possible. Stone screenings are scattered over the surface and thoroughly flushed in before rolling. After the sandstone is compacted a four-inch wearing surface of blue limestone is rolled on, the top layer being filled with coal tar as the work progresses. The cost of this construction is about 70 per cent. of that of the trap-rock roads.

The committee is also planning to give a very thorough illustration of culvert work, and A. Felgate, the Bridge Engineer of Cuyahoga County, will read a paper dealing with their construction. Examples will range from 36-inch box culverts to a magnificent concrete arch of a span of 280 feet now being erected over the Rocky River, west of Cleveland. Another question that will be taken up is that of the testing of materials, and the committee will emphasize the necessity for the careful inspection of such materials while also illustrating the methods by which accurate tests may be made.

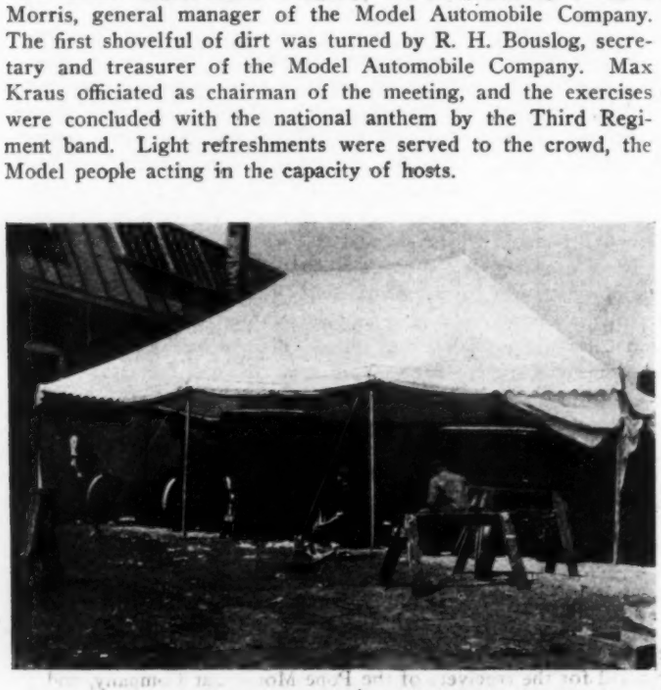
The committee in charge of the tests and demonstrations includes, besides F. A. Pease, the chairman, L. W. Page of the Office of Public Roads, Washington, D. C.; J. C. Wonders, State Highway Commissioner of Ohio; Col. W. D. Schier, State Highway Commissioner of Massachusetts; Robert Hoffman, City Engineer of Cleveland; A. B. Lea, Engineer of Cuyahoga County; W. A. Stinchcomb, Park Engineer of Cleveland; G. T. Barnesley, Road Engineer of Alleghany County, Pa.; William Dilger, Detroit, Mich., Superintendent of Parks, and H. H. Johnson and E. A. Merritt, of the Cleveland Automobile Club.

Capitalist Edwards Delivers Deed to Manager Morris

Climax of the ceremonies attending the breaking of the ground for the new factory of the Model Automobile Company, at Peru, Ind., which will be devoted exclusively to the manufacture of Great Western automobiles.

MODEL BREAKS GROUND FOR NEW PLANT

PERU, IND., July 31—Wednesday was a big day for the industry in this city, as it was the day set for breaking ground for the new factory of the Model Automobile Company, makers of Great Western cars, which will total in length some 470 feet. The occasion took the nature of a civic holiday, and the parade was under the auspices of the Automobile Club of Peru. All makes and styles of autos were in the procession, but all paid courtesy to the home concern by carry streamers bearing the legend, "Great Western Building Celebration," and proceeded to Oakdale, the suburb where the new factory is to be located. A large platform wagon served as a stage for the ceremonies, which took place at three o'clock in the afternoon and consisted of songs by the Model male quartet, speeches by C. Y. Andres, president of the Commercial Club, and A. L. Bodurtha, vice-president of the Model Automobile Company; presentation of deed and abstract to ground, by R. A. Edwards, president of the Oakdale Improvement Company, and acceptance by E. Mack Morris, general manager of the Model Automobile Company. The first shovelful of dirt was turned by R. H. Bouslog, secretary and treasurer of the Model Automobile Company. Max Kraus officiated as chairman of the meeting, and the exercises were concluded with the national anthem by the Third Regiment band. Light refreshments were served to the crowd, the Model people acting in the capacity of hosts.



Model Automobile Company Using Tents to Finish Cars

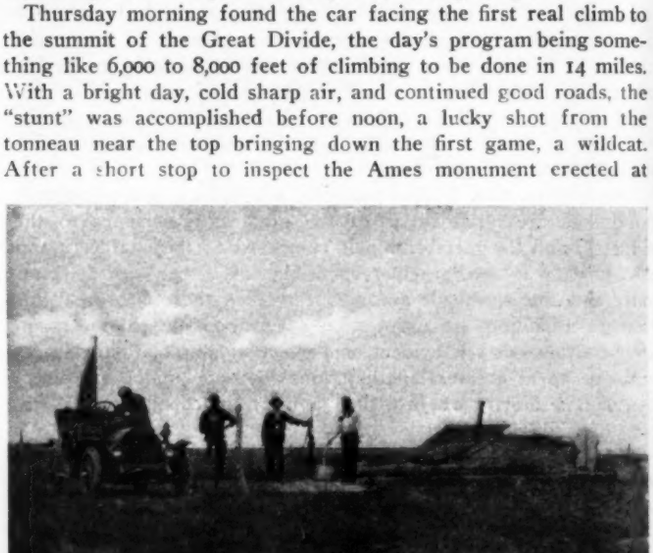
So pressed for space have the makers of Great Western automobiles become that it was necessary during the past month to erect tents to carry on the construction work during the erection of the new plant.

REGAL FINDING GOOD ROADS IN WEST

RAWLINS, WYO., July 29—Good is the best word to describe the condition of the roads as the Regal transcontinental plugger is finding them West of Denver. Leaving there after a very hearty send-off, and on a perfect day, the trip to Greely, 57 miles out, was made in excellent time. The course pursued took the car over the course of the annual Rocky Mountain Endurance run. Not contented with Greely as a day's work, the run was continued to Pierce, a boom town, and beyond that to Carr. The riding between the last two towns was the best by far that has been encountered thus far.

North of Carr and approaching the Wyoming line, the country suddenly broke into a series of small, sharp, steep foothills. The road surface continued so good, however, that the first hundred miles out of Carr were traversed in three hours and three minutes. Just beyond this darkness fell and the car was obliged to "creep" into Cheyenne, having no gas tanks.

Thursday morning found the car facing the first real climb to the summit of the Great Divide, the day's program being something like 6,000 to 8,000 feet of climbing to be done in 14 miles. With a bright day, cold sharp air, and continued good roads, the "stunt" was accomplished before noon, a lucky shot from the tonneau near the top bringing down the first game, a wildcat. After a short stop to inspect the Ames monument erected at



Home of the Guide That Showed the Regal the Way

This shack is located on the plains about 50 miles from Denver, and is the home of the guide that escorts tourists across the desert stretches where the road is hard to follow.

the Divide by the Union Pacific Railway, the tourists pursued their onward course to Laramie.

This was reached in a short time, because mostly down grade, the trip down being characterized by but one incident, that of losing the road. Little time was lost in finding the trail, however, and the day was closed with a fast run into Rock River.

Starting early the next morning from Rock River, trouble was also met very early, the car accompanying the pluggers being found three miles West, hopelessly sunk into an irrigating ditch. With the aid of block, tackle and stout manilla line, the car was quickly extricated, and they went on their way rejoicing that the pilot was on hand to direct them to the right roads. With this aid, six hours of hard work saw them into Medicine Bow, where the night was spent.

To-day saw the long fight lasting from Medicine to Rawlins, 60 miles. Noon found them at Hanna for dinner, and beyond that, the Union Pacific had to be crossed, two hours being lost. Fort Steele was reached at 3 p. m. and finding the bridge down, it was necessary to cross on the rails and ties of the Union Pacific steel bridge. Permission had to be obtained first, which lost them several valuable hours. This having been obtained with only the loss of time and temper, the car proceeded to bump its way across the river on the ties of the railroad bridge.

After the climbing which has been undergone, the prospects for the immediate future are looked upon with equanimity.

WHY STUDEBAKER IS EXCEEDINGLY ACTIVE

DETROIT, MICH., Aug. 2—Is the automobile industry about to witness the formation of another "combine" that will combat the General Motors Company, at present holding the center of the stage through its acquisition of a string of factories in Detroit and throughout Michigan? Those actively identified with the latest move which is causing speculation, deny that there is any thought of a "trust," but wise ones shake their heads and opine that if nothing more tangible comes of it, a hot pace will be set for others as a direct result of the activities of the Studebaker E-M-F interests.

Following close in the wake of the E-M-F Company's purchase of the De Luxe Motor Car Company's plant, and the announcement of the Studebaker-Flanders "Twenty" for next season, comes the news that the same concern has bought outright the plants of the Western Malleable Steel and Forge Company adjoining the De Luxe property, and the Monroe Body Company, of Pontiac, Mich., consideration for both being in the neighborhood of $500,000.

The acquisition of these plants puts the E-M-F Company in a position where it is practically independent in the matter of drop forgings (in the manufacture of which, on an immense scale, the Western Malleable Steel and Forge Company has been engaged) and in bodies.

Not content with what has already been accomplished, permits have been issued to the E-M-F Company for two new structures it will erect, on land adjoining the De Luxe plant, and which will cost $75,000. Both are to be three stories in height, one 460 x 56 feet on the ground, and the other 240 x 60 feet. It is this rapid expansion on the part of the E-M-F Company and its alliance wtih the Studebaker Company (which will market the entire output of the two local factories in addition to the Studebaker-Garford car) that has set tongues wagging anent the possibility of a "combine" to oppose the General Motors Company.

"Nothing to it," says Walter E. Flanders, president and general manager of the E-M-F Company. "We will be too busy the coming season producing 15,000 Thirties and 25,000 of the new Twenties, to bother about what the other fellow is doing. In order to manufacture cars on such a hitherto unheard-of scale, and turn them out on time, we must have sources of supply that will absolutely insure against anything going wrong. That has been the reason prompting us to acquire these additional properties—that and nothing more. We wanted to be independent. Within a few months, with the additions now being made to the E-M-F plant and the new structures that will shortly be commenced on the property just acquired, we will be in that position."

Fairview's Relations to Chalmers-Detroit

DETROIT, MICH., Aug. 2—The Fairview Motor Company, recently incorporated, is virtually a part of the Chalmers-Detroit Company, organized for the purpose of manufacturing and putting on the market a motor truck (with which experiments have been conducted for some time with success), taxicabs, and other vehicles of a business class. Plans are being prepared for a new $150,000 plant, to be erected near the Chalmers-Detroit buildings.

Where the Studebaker-Flanders "Twenty" Will Be Built at Detroit

Rumors to the effect that the E. R. Thomas Motor Company of Buffalo was about to be merged with the Chalmers-Detroit Company gained wide circulation and were given some credence. Hugh Chalmers brands such talk as idle, declaring that a move of this nature is not contemplated. E. R. Thomas also is emphatic in declaring that no negotiations are pending, and that none have been started.

Timken Learns Detroit Is Growing

DETROIT, MICH., Aug. 2—The Timken-Detroit Axle Company has received a forceful but by no means welcome demonstration of the fact that, thanks in a large measure to the automobile industry, Detroit is growing by leaps and bounds. Upward of 300 employes were brought here from the parent plant at Canton, Ohio, when the local factory opened a month ago. Many of the imported men were unable to find houses for their families and returned to Canton. The shortage of houses still continues, and the firm is at a loss to know how the men and their families are to be housed that a sufficient supply of skilled labor may be kept on hand until new houses are erected.

SATISFACTORY END OF POPE RECEIVERSHIP

NEWARK, N. J., Aug. 2—More details of the wind-up of the Pope Manufacturing Company's receivership have been made public since the first announcement last week. According to the final report filed by Sherrerd Depue, representing Albert L. Pope, Egbert J. Tamblyn and George A. Yule, the receivers, 23,714 and a fraction shares of first preferred stock are involved in the reorganization scheme, and there are sufficient assets remaining to pay a dividend of 41.28 per cent. The receivers asked permission to pay into court $8,061.42, representing the dividend on the 195 shares of stock not included in the reorganization, for ultimate distribution among their holders. The report also indicated that the receivers paid to general creditors claims amounting to $1,505,798.30, with interest.

Vice-Chancellor Howell directed the receivers to turn back the plants of the company at Hartford, Conn., and Westfield, Mass., to the reorganization committee, composed of Harry Bronner, F. H. Ecker and Harry Hecksher. This committee further offered to pay all the expenses of the receivership. Mr. Depue also acted for the receivers of the Pope Motor Car Company, and in his report declared that all commissions of the receivers in the various jurisdictions, remuneration for receivers' counsel and all other charges pertinent to the receivership had been settled.

Told in the Progress of the Industry

Longest Trip on a Moon Car—Very recently a long tour, started on the spur of the moment, was taken by a Western man without any necessary repair or replacement to spoil the continuous pleasure of the trip. Starting from Chicago immediately after the Cobe and Indiana Trophy races, A. M. Robbins, manager of the Centaur Motor Co., of Illinois, drove to Jackson, Mich. The next day he drove to Detroit and, putting the car on a boat, he shipped it to Buffalo, running to Geneva, N. Y., that afternoon in a heavy rainstorm. Syracuse was made the next noon and Albany was reached that night, 168 miles in 6 hours and 15 minutes. The next day Robbins made 198 miles to Boston in 10 hours. After driving 700 miles around Boston he came back over the "scenic" route through the beautiful Berkshires and northern Massachusetts—Old Concord, Fitchburg, Brattleboro, Vt., Bennington and Troy. From Albany he drove through Canandaigua, Seneca Falls, Buffalo, Toledo and South Bend. Not once on the trip of 3,000 miles did he touch a tool to the car, not even to replace a spark plug. The day of his return the car went into demonstrating service without being even looked over.

For Premier Owners in Philadelphia—For the entertainment of its numerous patrons, the Motor Company, of Philadelphia, which handles the Premier car in the Quaker City, has promoted a roadability run to Cape May for September 11-12 next. Only owners of Premier cars will be eligible, and the first prize will be a solid silver punch bowl, which will go to the owner of the car who covers the route of upward of 90 miles, nearest to the secret official time. On arrival at Hotel Cape May, all the participants, drivers and friends will become the guests of the motor company, one whole floor of the hotel having been reserved for them. After 6 o'clock dinner there will be dancing in the ballroom, presentation of prizes by President H. O. Smith, and a late supper in the grill room. Sunday morning will be spent in the surf. sailing and fishing and, following midday dinner, the start for home will be made at about 2 o'clock. The company has made arrangements for stops for refreshments at Egg Harbor and Tuckahoe on the downward trip. Thirty-seven entries have already been received.

Injunction Granted to Mezger—In the past the automobile business has been famous for the ease and freedom with which ideas were borrowed bodily, patented ideas being no more sacred than others. Now the situation is beginning to improve, because owners of patents are beginning to fight to retain their rights under the government papers granted them. Thus, the C. A. Mezger Department of the United Manufacturers announces that it has secured an injunction against the New York Sporting Goods Company in the Circuit Court for the Southern District of New York, restraining the latter from selling imitations of the "Automatic" wind shield, or in any way infringing upon the patents controlling the same. Moreover, the Mezger Department announces that the future policy will be to protect itself under all of its patents.

Rambler Winning Honors on Coast—Four hundred and eighty-seven miles, the distance between Los Angeles and San Francisco, in 16 hours 46 minutes and 30 seconds is the new record established last week by L. B. Harvey, of San Francisco, in his new Rambler Close Coupled Model Forty-Five. Harvey left Los Angeles at 3 in the morning, reaching Santa Barbara in 4 hours and 55 minutes. Between Los Olivas and Santa Maria time was lost because of washouts on the road. A puncture delayed the trip at San Luis Obispo, and at one point the driver lost the road, thereby losing half an hour. This Rambler also holds the record for the round trip between Los Angeles and San Diego, winning the Chanslor-Lyon trophy in that run in December of last year. Three hundred and thirty-one miles in 10 hours and 32 minutes, over roads not prepared or patrolled, is the record in this contest.

Automobile Parts Business Expanding—Among the newcomers in Detroit, indirectly connected with the automobile business, is the firm of Schweppe & Wilt, of which W. H. Schweppe is president; A. D. Wilt, Jr., vice president and general manager; Marvine Gorham, secretary and treasurer, and F. R. Heym, factory manager. Starting about two years ago to manufacture steering gears, the growth has been so rapid that incorporation was deemed necessary. Recently the firm has moved into larger quarters on the corner of Meldrum and Champlain streets. In the new building many additions have been made to the equipment, including a large number of automatic and screw machines. With improved factory facilities and a highly specialized personnel, the business is growing by leaps and bounds.

Big Implement House Buys Ramblers—Within the past two or three years, implement dealers all over the country have taken to watching with careful eye the progress of the automobile. In this connection, it is significant to note that one of the largest, located in the middle West, has just completed arrangements to handle the Rambler. This is the Kingman St. Louis Implement Co., St. Louis, and the territory assigned to it is Arkansas, eastern Missouri and southern Illinois. Before selecting this car the implement company satisfied itself as to the selling merits of the same in competition with several well-known makes. The choice of the Rambler is then very gratifying to its makers, the Thomas B. Jeffrey Co., Kenosha, Wis.

Rider-Lewis will Build 3,000 Cars—Attention is called to the fact that when it was stated that the Rider-Lewis Motor Car Company would produce "a small but nearly perfect" number of machines, the word small was used in a relative sense. It develops, however, that this number has been increased to no less than 3,000 cars for the balance of 1909 and the year 1910. In the description of the output of this company in the July 22 issue of THE AUTOMOBILE, it was erroneously stated that the four-cylinder car was equipped with 2 1-2-inch tires. This was a typographical error for 3 1-2-inch tires, the actual size fitted.

Couldn't Have Won Without "Gobbo"—Of the eight starters in the last Brighton Beach 24-hour race, six were equipped with the god of luck, "Gobbo," showing that even the nerviest and most daring of drivers are superstitious. This was distinctly a "Gobbo" victory, as was also the 100-mile race at the same race meeting, in which the S. P. O. car went through the entire contest without tire or other trouble, due to the presence on the radiator of the good luck bringer. Its makers, the Motor Car Equipment Company, New York City, report a very large and growing demand for this and similar emblems.

E. & J. Build in Detroit—The Edmunds & Jones Manufacturing Company, makers of E. & J lamps, are building a new plant which will quadruple their present capacity. It is located at Lawton street and the Michigan Central Railroad. The building is to be three stories high and will be in two wings, 215 feet long and 60 and 90 feet wide. This will give the company a floor space of over 60,000 square feet. In addition there will be a power plant 40x60 feet. Connection will be made with the railroad by a private spur track. The factory will be in operation in time to assure prompt deliveries in 1910.

Michelins "As Usual" at Brighton—After the recent Brighton Beach races were over, Wilbur Hobbs, manager of the New York branch of the Michelin Tire Company, although he had been on duty steadily, was not too tired to talk about its victories. "Michelins, 'as usual,' won first, second and third in the 24-hour contest," he said, "as well as in the 100-mile, and in addition we took first in the 50-mile, the 5-mile and the mile events. In fact, we secured first place in every event on both days except in an uncontested 5-mile race and the motorcycle races. That's going some."

Automobile Parade for King Wamba—One of the spectacular features of the King Wamba festival, which is to be held at Toledo, O., late in August, and which has been extensively advertised throughout the country, will be an automobile parade. It will take place at night, and handsome and valuable prizes will be given for the winners in three classes, into which the kinds of decoration are to be divided, viz.: handsome, grotesque and mechanical. In each class the winner is to receive a fine silver loving cup with corresponding prizes for secondary winners.

Glove Makers Have High Old Time—On Saturday of the coming week there will be "nothing doing" at the plant of the Fried-Ostermann Company, at Rockford, Ill., since this is the day set aside for the employees' outing. Taking the steamer to Brown's Creek, the day will be spent in having a high old time. An elaborate program has been arranged, including athletic games, baseball games, together with much vocal entertainment. An orchestra will be taken along, while the men and women have both formed quartets.

Tire Prices Not Increased Proportionately—While the price of all makes of tires has been increased very recently, the manufacturers of Continental tires give it as their opinion that the prices have not gone up as much in proportion as has the price of raw rubber which tire makers are obliged to pay. Attention is also called to the new Continental list, No. 12, and a booklet that has been recently published entitled "Continental Ready-Flated Tires," which is now available for free distribution.

1906 Loco "on the Job"—George T. Lincoln, a Boston automobile enthusiast writes that his 1906 Locomobile has just finished a tour of 1,100 miles in England and Wales. He says the car is evidently determined that no Englishman shall suspect that it has already some 50,000 miles to its credit in the United States. It is running as well as a new car and much quieter than the English cars met on the road. Mr. Lincoln is now in France, where he expects to make a long tour.

Timken Axle Makers' Banquet—The Officers of the Timken-Detroit Axle Company tendered a banquet to their president, William R. Timken, at the Hotel Pontchartrain, Detroit, last week. Among those present were Mr. and Mrs. A. R. Demory, Mr. and Mrs. E. W. Lewis, Mr. and Mrs. H. W. Alden, Mr. and Mrs. F. C. Gilbert and Mr. and Mrs. W. H. Hutton, all of Detroit, and Webb Artz, of Cleveland.

Ajax Shows Well in Glidden—Reports from Denver show that the pairs of Maxwells and of Brush runabouts in the Glidden tour have had remarkably little trouble with their Ajax tires. The Maxwells traveled from the factory, at Tarrytown, N. Y., to Denver, a distance of 2,700 miles, on the original air, and the Brushes would have made a similar record were it not for a single puncture on a rear tire.

PERSONAL TRADE MENTION

D. B. Marwick, formerly superintendent of the Columbia Steel Company, and more recently special steel export with the A. O. Smith Company, has been appointed general manager of the Stanley Steel Works, New Britain, Conn.

R. H. Williams has joined the ranks of the F. B. Stearns Company, of Cleveland and will represent it upon the road in the southern section of the country. He was formerly identified with the retail trade.

William S. Eaton, who, until lately, was with Burr & Co., New York City, has accepted the position of superintendent with James Cunningham, Son & Co.

Cleveland-Canton Spring Company's Factory As It Appears with the Latest Addition

CLEVELAND-CANTON SPRINGS

CANTON, O., Aug. 2.—The Cleveland-Canton Spring Company is now occupying a large addition to its factory, which was recently added to keep pace with its growing trade in automobile springs. It was not until about a year ago that this company seriously engaged in the manufacture of springs for automobile use, but it has met with remarkable success, and is now supplying a number of prominent manufacturers.

The company has spent considerable time and money in experimenting, and has decided that, aside from the proper quality of steel, the most important factor in the production of a spring to meet the exactions of automobile usage is the heat treatment. To carry out its ideas in this respect the company has installed special gas-heated kilns which can be kept at a constant known temperature, and in which the steel bars never come in direct contact with the flame. Supplementing these kilns are a series of oil baths kept at certain degrees of heat to assist in tempering.

The springs in different stages of development are put through many different tests. First is a chemical analysis of the steel bars, showing whether they come up to the specifications. Next are the tests for crystallization and permanent set. Finally the springs are tested for mechanical construction and for carrying capacity, and then, after the final grinding and polishing, they are ready for use.

The exclusive devotion of such a large plant to the manufacture of a single part is one of the best instances of the specialization now characteristic of the automobile industry. That it is a change for the better no one can doubt, as few car manufacturers could afford such scientific methods.

CHICAGO DEALERS' FIELD DAY

The second annual field day of the Chicago "automobile row" was held last Thursday at the Fox River Country Club. More than a hundred dealers, with their employees and friends, made the fifty-mile trip in automobiles and enjoyed a day out of doors. The program included all sorts of athletic and other events, and although no world's records were broken everyone seemed well satisfied. Henry Paulman, the Pierce-Arrow representative, won the golf championship; the bicycle race was taken by Harry W. Cooper, manager of the Excelsior Supply Company's branch; the 100-yard dash went to Harry Watts, of the United Manufacturers; the trap shooting to Thomas J. Hay, manager of the Ford branch; the pool championship to F. E. Sparks, of the United Manufacturers; the swimming race to George Gaidzik, of *Motor Age*, and the bowling to C. G. Sinsabaugh, also of *Motor Age*. Harry Watts took the Paulman trophy for the all-round championship by his victory in the sprint and second place in the swimming race. The roll of the dealers includes some real athletes, too, for George Gaidzik is the Olympic swimming champion.

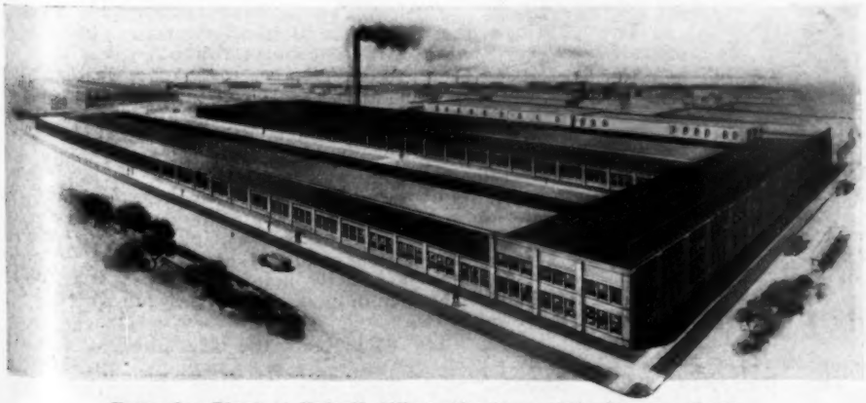
IN AND ABOUT THE AGENCIES

Thomas, Boston—At the dealers' convention of the E. R. Thomas Motor Company, at Buffalo, last week, it was announced that Charles S. Henshaw has been engaged to open and manage a Boston branch for the sale of the Thomas line. The new arrangement took effect on August 1, and it is the company's intention to establish one of the finest branch houses in the East. Until the new location is decided upon, the Boston headquarters will be at 288 Columbus avenue, where Mr. Henshaw sold Thomas cars successfully for a number of years.

Pullman Agencies—The York Motor Car Company, of York, Pa., announces the following 1910 agencies for the Pullman: L. M. Alleman, Littlestown, Pa.; Longstreth Motor Car Company, Philadelphia; B. F. Futer, Lancaster, Pa.; Hamilton Auto Company, Allentown, Pa.; D. B. Hoffer & Sons, Reading, Pa.; V. A. Simrell, Scranton, Pa.; Syracuse Motor Car Company, Syracuse, N. Y.; Pullman Motor Car Company, Cleveland, O.

RECENT BUSINESS CHANGES

King Leather Tire Company, of Milwaukee, Wis., on and after August 1, will occupy new quarters at 3417-3419 Vliet street. The large volume of business done forced the company to make this change.



Extensive Plant at Detroit, Where the Hupmobile Cars Are Built

Recent necessary additions to the factory where the Hupp Motor Car Company holds forth have brought the size of the plant up to the present imposing appearance as shown in the illustration above.

Information for Auto Users

New Eames Socket Wrench—A socket set which looks as though it might earn its keep in automobile work, is that brought out by the Eames Manufacturing Company, 44 Broad street, Boston. The handle is hinged just above the socket holder, and may be used at any angle; it also has a removable T-head. Twenty-two sockets are furnished, including a special long one

FULL CASE OF EAMES SOCKET WRENCHES

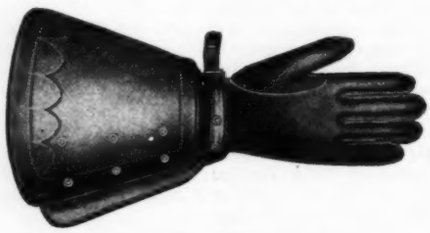
for spark plugs; they are of pressed steel, thoroughly annealed, and are held in place by a friction grip. All common sizes of hex and square nuts and cap screws are provided for. The case consists simply of a heavy wood block bound with brass, with a sheet of oak-tanned leather as cover. There are no hinges or catches to break and no thin wood cover to smash. The leather also keeps the wrenches from rattling. The entire set weighs only five pounds.

Veeder New Small Odometer—The Veeder Manufacturing Company, of Hartford, Conn., recognizing the fact that the small attachments on motorcycles are subjected to very hard usage, has brought out a special type of small odometer or cyclometer for this work. The case is larger in size than in the regular bicycle cyclometer, the gearing is heavier and it is equipped with a larger star wheel. A feature deserving special mention is the adjustable bracket, which can be adapted to any American or foreign motorcycle by adjusting a single nut. The instrument has both trip and season dials, with the mile figures in white and the tenths in red, on a black background. The figures are large enough to be easily read from the seat of the machine. The cut, about two-thirds full size, gives a very good idea of the neat and compact appearance of the instrument in its entirety.

SMALL VEEDER ODOMETER

General Accumulator Company Specialties—A good line of automobile specialties has been put on the market by the General Accumulator and Battery Company of Milwaukee, Wis. One of these is the "Radium" battery, of which the distinctive feature is the gauge, which tells the available charge at any time, and obviates the possibility of running out of current on the road, as well as the danger from overcharge. This company's decarbonizer has been on the market for four years, and has found a wide recognition among autoists who tried its use in cleaning their cylinders. The advantages of the chemical method of removing carbon over the mechanical method are now widely admitted. A third specialty is a new spark-plug, which is doubly insulated. All the lower inside walls are lined with durable fireproof porcelain, in addition to the usual porcelain insulation, so that short-circuiting is practically impossible.

New Price Automobile Gauntlet—A new style of the Price gauntlet has been put on the market by the makers, the Fried-Ostermann Company of Rockford, Ill. Many autoists will find this gauntlet very convenient, as its construction permits either a broad, flaring cuff, as in the familiar non-adjustable types, or one

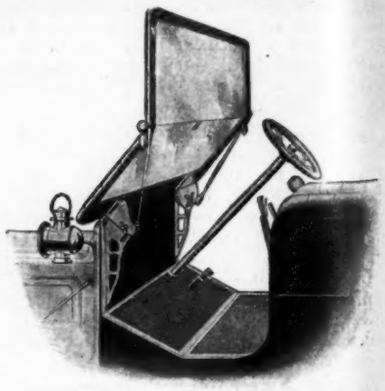


NEW STYLE PRICE GAUNTLET GLOVE

that will fit the sleeve of a light-weight coat snugly, keeping out the dust. The adjustment is accomplished by means of snap buttons and requires only a few seconds' time.

Perry Non-Skid Tire Chains—This new device, marketed by the Perry Chain Grip Company, of Lansing, Mich., differs in several respects from the usual type. All the cross chains are swiveled, so that they wear on all sides equally. Then, too, each cross chain has a spring tension hook, which keeps it tight and prevents rattling. Should one break, there is no need to go on with the ends rattling against the fenders, as a new one can be snapped in place in a few seconds. The separate cross chains are sold at a nominal price and a few of them can be kept in the tool box.

The Burrowes Wind Shield—The Burrowes wind shield, made by the E. T. Burrowes Company of Portland, Me., is of the divided type, but differs from the usual construction in that the angle of both the upper and lower portions is adjustable. It may thus be placed in half a dozen different positions to suit the driver's convenience. It may be set with both sections vertical, in line with the dash, in the usual position; or the upper section may be folded down on



DIVIDED TYPE OF BURROWES SHIELD

the lower, and both tilted back, so that their upper edge is well below the driver's line of vision. For work with a cape top in stormy weather it may be set with the lower section tilted back and the upper vertical; in this position its upper edge is far enough below the top to allow a ventilating current of air to pass, while at the same time it is far enough behind the front edge of the top to keep out the rain. Another desirable feature is that there is no horizontal brass bar on the dividing line to obstruct the driver's view. The frame of the shield is made in wood, either birch or mahogany, reinforced with metal. A rain-drip extends over the joint with the dash, thus preventing water from running down on the inside. The plate glass of the top section is 3-16 inch thick and that of the lower section ¼ inch; the upper overlaps the lower ½ inch, thus making a rain-proof joint. When adjusted and locked in any position the shield will not rattle, and, in fact, is said to be more rigid than most non-adjustable screens.

Stamped Aluminum Floor Covering—The Factory Sales Company, 1438 Michigan avenue, Chicago, announces a new automobile floor covering, for which is claimed many points of superiority over rubber, corkaline and other materials. This flooring is stamped from an aluminum alloy into pyramid shape, and is afterward sand-blasted to give a uniform rough finish. It is designed to lay over the regular floor boards, secured in place by special binding strips. The metal is much harder than ordinary aluminum, making it very durable. Its most attractive feature, of course, is its cleanliness. It is furnished in sheets 36 x 85 inches, and as it is finished clear to the edges there is no waste. This flooring is being adopted by several makers, and will be found especially helpful to those who are rebuilding or remodeling old cars.

To Keep the Machinery Clean—The Auto Waste Company, of Hartford, Conn., has placed on the market a high-grade Sea Island long-fiber waste, especially made for automobile use. The same company also makes a line of wiping cloths of all sizes.